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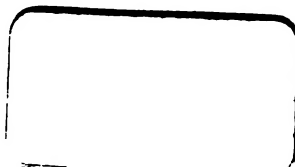
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THE

# AMERICAN EPHEMERIS

AND

## NAUTICAL ALMANAC

FOR THE YEAR

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*FIRST EDITION*

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*PUBLISHED BY AUTHORITY OF CONGRESS*

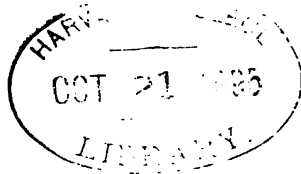
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1895.

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## PREFACE.

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THE arrangement of *The American Ephemeris* adopted in the volume for the year 1882, and explained in the Appendix to that volume, has been continued without radical change to the present time.

The additions then made comprise more complete data for eclipses of the sun, diagrams showing the configurations of the satellites of Jupiter, data respecting the disks of Mercury and Venus for the reduction of meridian and photometric observations, and diagrams, with tables, for identifying any known satellites of other planets. The work is divided into three parts, as follows:—

Part I, *Ephemeris for the Meridian of Greenwich*, gives the geocentric and heliocentric positions of the major planets, the Ephemeris of the Sun, and other fundamental astronomical data for equi-distant intervals of Greenwich mean time.

Part II, *Ephemeris for the Meridian of Washington*, gives the ephemerides of the fixed stars, sun, moon, and major planets for transit over the meridian of the old Naval Observatory, Washington. The mean places of the fixed stars and the data for their reduction are also included in this part. The list of mean and apparent places of fixed stars was greatly enlarged in 1885 for the convenience of field-astronomers.

Part III, *Phenomena*, contains predictions of phenomena to be observed, with data for their computation. Washington mean time of the old Naval Observatory is used in this part except in a few cases, notably that of eclipses, where Greenwich mean time was judged more convenient.

SIMON NEWCOMB,  
*Professor U. S. Navy,*  
*Director Nautical Almanac.*

WASHINGTON, *June*, 1895.





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# CHRONOLOGICAL ERAS AND CYCLES.

## CHRONOLOGICAL ERAS.

THE YEAR 1898, WHICH COMPRISES THE LATTER PART OF THE 122ND AND THE BEGINNING OF THE 123RD YEAR OF THE INDEPENDENCE OF THE UNITED STATES OF AMERICA, CORRESPONDS TO—

The year 6611 of the Julian Period;

- “ 7406–7407 of the Byzantine era, the year 7407 commencing on September 1st;
- “ 5658–5659 of the Jewish era, the year 5659 commencing on September 17th, or, more exactly, at sunset on September 16th;
- “ 2651 since the foundation of Rome, according to VARRO;
- “ 2645 since the beginning of the era of NABONASSAR, which has been assigned to Wednesday, the 26th of February of the 3967th year of the Julian Period; corresponding, in the notation of chronologists, to the 747th; and, in the notation of astronomers, to the 746th year before the birth of CHRIST;
- “ 2674 of the Olympiads, or the second year of the 669th Olympiad commencing in July, 1898, if we fix the era of the Olympiads at 775½ years before CHRIST, or near the beginning of July of the year 3938 of the Julian Period;
- “ 2210 of the Grecian era, or the era of the SELEUCIDÆ;
- “ 1614 of the era of DIOCLETIAN;
- “ 2558 of the Japanese era and to the 31st year of the period entitled “Meiji.”

The year 1316 of the Mohammedan era, or the era of the Hegira, begins on the 22nd day of May, 1898.

The first day of January of the year 1898 is the 2,414,291st day since the commencement of the Julian Period.

## CHRONOLOGICAL CYCLES.

Dominical Letter . . . . .	B	Solar Cycle . . . . .	3
Epact . . . . .	7	Roman Indiction . . . . .	11
Lunar Cycle or Golden Number . . . . .	18	Julian Period . . . . .	6611

# SYMBOLS AND ABBREVIATIONS.

## SIGNS OF THE PLANETS, ETC.

☉	The Sun.	♂	Mars.
☾	The Moon.	♃	Jupiter.
☿	Mercury.	♄	Saturn.
♀	Venus.	♅	Uranus.
♁	The Earth.	♆	Neptune.

## SIGNS OF THE ZODIAC.

Spring Signs.	{	1.	♈	Aries.	Autumn Signs.	{	7.	♎	Libra.
		2.	♉	Taurus.			8.	♏	Scorpius.
		3.	♊	Gemini.			9.	♐	Sagittarius.
Summer Signs.	{	4.	♋	Cancer.	Winter Signs.	{	10.	♑	Capricornus.
		5.	♌	Leo.			11.	♒	Aquarius.
		6.	♍	Virgo.			12.	♓	Pisces.

## ASPECTS

- ♌ Conjunction, or having the same Longitude or Right Ascension.
- ☐ Quadrature, or differing 90° in Longitude or Right Ascension.
- ♌ Opposition, or differing 180° in Longitude or Right Ascension.

## ABBREVIATIONS.

♊	Ascending Node.	°	Degrees.
♋	Descending Node.	'	Minutes of Arc.
N.	North.	"	Seconds of Arc.
S.	South.	h	Hours.
E.	East.	m	Minutes of Time.
W.	West.	s	Seconds of Time.

PART I

---

ASTRONOMICAL EPHEMERIS

FOR THE

MERIDIAN OF GREENWICH

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sideral Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ' "	"	' "	s	m s	s
Sat.	1	18 48 33.88	11.037	S. 22 59 1.6	+12.81	16 18.37	71.04	3 55.32	1.177
SUN.	2	18 52 58.55	11.021	22 53 40.7	13.94	16 18.37	70.98	4 23.36	1.160
Mon.	3	18 57 22.85	11.004	22 47 52.4	15.07	16 18.37	70.92	4 51.02	1.143
Tues.	4	19 1 46.73	10.986	22 41 37.1	+16.20	16 18.36	70.86	5 18.26	1.126
Wed.	5	19 6 10.18	10.967	22 34 54.8	17.32	16 18.35	70.81	5 45.08	1.108
Thur.	6	19 10 33.16	10.947	22 27 45.7	18.43	16 18.33	70.75	6 11.42	1.088
Frid.	7	19 14 55.65	10.927	22 20 10.2	+19.53	16 18.30	70.69	6 37.29	1.067
Sat.	8	19 19 17.63	10.905	22 12 8.3	20.62	16 18.26	70.63	7 2.64	1.045
SUN.	9	19 23 39.08	10.882	22 3 40.3	21.71	16 18.22	70.56	7 27.47	1.023
Mon.	10	19 27 59.98	10.859	21 54 46.4	+22.78	16 18.18	70.48	7 51.74	1.000
Tues.	11	19 32 20.31	10.835	21 45 26.9	23.84	16 18.13	70.40	8 15.46	0.975
Wed.	12	19 36 40.05	10.810	21 35 42.0	24.89	16 18.07	70.32	8 38.57	0.950
Thur.	13	19 40 59.18	10.784	21 25 32.0	+25.93	16 18.00	70.23	9 1.08	0.925
Frid.	14	19 45 17.69	10.757	21 14 57.1	26.96	16 17.93	70.14	9 22.96	0.899
Sat.	15	19 49 35.54	10.730	21 3 57.7	27.98	16 17.86	70.05	9 44.21	0.871
SUN.	16	19 53 52.73	10.702	20 52 34.1	+28.98	16 17.78	69.96	10 4.79	0.842
Mon.	17	19 58 9.25	10.673	20 40 46.5	29.97	16 17.70	69.86	10 24.69	0.814
Tues.	18	20 2 25.06	10.643	20 28 35.3	30.95	16 17.61	69.76	10 43.89	0.785
Wed.	19	20 6 40.15	10.613	20 16 0.9	+31.91	16 17.52	69.66	11 2.38	0.755
Thur.	20	20 10 54.50	10.582	20 3 3.6	32.86	16 17.42	69.56	11 20.12	0.724
Frid.	21	20 15 8.11	10.551	19 49 43.7	33.79	16 17.32	69.46	11 37.11	0.693
Sat.	22	20 19 20.94	10.519	19 36 1.6	+34.71	16 17.22	69.35	11 53.36	0.661
SUN.	23	20 23 33.00	10.486	19 21 57.8	35.61	16 17.11	69.24	12 8.82	0.628
Mon.	24	20 27 44.25	10.452	19 7 32.6	36.49	16 17.00	69.13	12 23.47	0.595
Tues.	25	20 31 54.71	10.418	18 52 46.4	+37.35	16 16.89	69.02	12 37.34	0.561
Wed.	26	20 36 4.34	10.384	18 37 39.6	38.20	16 16.77	68.91	12 50.37	0.526
Thur.	27	20 40 13.15	10.350	18 22 12.6	39.04	16 16.65	68.80	13 2.59	0.492
Frid.	28	20 44 21.12	10.315	18 6 25.8	+39.85	16 16.53	68.68	13 13.97	0.457
Sat.	29	20 48 28.26	10.280	17 50 19.7	40.65	16 16.40	68.57	13 24.53	0.422
SUN.	30	20 52 34.55	10.245	17 33 54.6	41.43	16 16.27	68.46	13 34.23	0.387
Mon.	31	20 56 40.00	10.209	17 17 10.9	42.20	16 16.13	68.35	13 43.10	0.352
Tues.	32	21 0 44.60	10.174	S. 17 0 9.0	+42.95	16 15.99	68.23	13 51.12	0.318

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sideral time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
Sat. SUN. Mon.	1	<sup>h</sup> 18 <sup>m</sup> 48 <sup>s</sup> 33.15	<sup>s</sup> 11.035	<sup>°</sup> S. 22 <sup>'</sup> 59 <sup>"</sup> 2.4	<sup>"</sup> +12.79	<sup>m</sup> 3 <sup>s</sup> 55.24	<sup>s</sup> 1.176	<sup>h</sup> 18 <sup>m</sup> 44 <sup>s</sup> 37.92
	2	18 52 57.75	11.018	22 53 41.7	13.93	4 23.27	1.160	18 48 34.48
	3	18 57 21.96	11.000	22 47 53.7	15.07	4 50.92	1.143	18 52 31.04
Tues.	4	19 1 45.76	10.982	22 41 38.5	+16.20	5 18.16	1.126	18 56 27.60
Wed.	5	19 6 9.12	10.964	22 34 56.4	17.31	5 44.97	1.108	19 0 24.15
Thur.	6	19 10 32.02	10.945	22 27 47.7	18.42	6 11.31	1.088	19 4 20.71
Frid.	7	19 14 54.44	10.925	22 20 12.4	+19.52	6 37.17	1.067	19 8 17.27
Sat.	8	19 19 16.35	10.903	22 12 10.7	20.61	7 2.52	1.045	19 12 13.83
SUN.	9	19 23 37.73	10.880	22 3 43.0	21.69	7 27.34	1.023	19 16 10.39
Mon.	10	19 27 58.56	10.856	21 54 49.4	+22.76	7 51.61	1.000	19 20 6.95
Tues.	11	19 32 18.82	10.832	21 45 30.2	23.83	8 15.32	0.975	19 24 3.50
Wed.	12	19 36 38.49	10.807	21 35 45.6	24.88	8 38.43	0.950	19 28 0.06
Thur.	13	19 40 57.56	10.781	21 25 35.9	+25.92	9 0.94	0.925	19 31 56.62
Frid.	14	19 45 16.00	10.755	21 15 1.4	26.95	9 22.82	0.899	19 35 53.18
Sat.	15	19 49 33.80	10.728	21 4 2.3	27.97	9 44.07	0.871	19 39 49.73
SUN.	16	19 53 50.94	10.700	20 52 39.0	+28.97	10 4.65	0.843	19 43 46.29
Mon.	17	19 58 7.40	10.671	20 40 51.8	29.96	10 24.55	0.814	19 47 42.85
Tues.	18	20 2 23.15	10.641	20 28 40.9	30.94	10 43.75	0.785	19 51 39.40
Wed.	19	20 6 38.20	10.611	20 16 6.8	+31.90	11 2.24	0.755	19 55 35.96
Thur.	20	20 10 52.50	10.580	20 3 9.8	32.84	11 19.98	0.724	19 59 32.52
Frid.	21	20 15 6.06	10.549	19 49 50.3	33.77	11 36.98	0.693	20 3 29.08
Sat.	22	20 19 18.86	10.517	19 36 8.6	+34.69	11 53.23	0.661	20 7 25.63
SUN.	23	20 23 30.88	10.484	19 22 5.1	35.59	12 8.69	0.628	20 11 22.19
Mon.	24	20 27 42.10	10.451	19 7 40.2	36.47	12 23.35	0.595	20 15 18.75
Tues.	25	20 31 52.52	10.417	18 52 54.3	+37.34	12 37.22	0.561	20 19 15.30
Wed.	26	20 36 2.12	10.383	18 37 47.8	38.19	12 50.26	0.526	20 23 11.86
Thur.	27	20 40 10.90	10.348	18 22 21.1	39.02	13 2.48	0.492	20 27 8.42
Frid.	28	20 44 18.84	10.314	18 6 34.7	+39.84	13 13.87	0.457	20 31 4.97
Sat.	29	20 48 25.96	10.279	17 50 28.8	40.64	13 24.43	0.422	20 35 1.53
SUN.	30	20 52 32.23	10.244	17 34 4.0	41.42	13 34.14	0.387	20 38 58.09
Mon.	31	20 56 37.66	10.209	17 17 20.6	42.19	13 43.02	0.352	20 42 54.64
Tues.	32	21 0 42.25	10.174	S. 17 0 19.0	+42.94	13 51.05	0.318	20 46 51.20

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour,  
+ 0°.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	1	281 10 2.5	9 46.7	152.88	+ 0.70	9.9926725	- 1.1	h m s 5 14 30.42
2	2	282 11 11.6	10 55.6	152.88	0.68	9.9926710	0.0	5 10 34.50
3	3	283 12 20.4	12 4.3	152.87	0.64	9.9926722	+ 1.0	5 6 38.59
4	4	284 13 29.0	13 12.7	152.85	+ 0.57	9.9926759	+ 2.0	5 2 42.68
5	5	285 14 37.1	14 20.6	152.83	0.47	9.9926823	3.2	4 58 46.77
6	6	286 15 44.9	15 28.2	152.82	0.36	9.9926916	4.4	4 54 50.85
7	7	287 16 52.6	16 35.7	152.81	+ 0.23	9.9927037	+ 5.6	4 50 54.94
8	8	288 17 59.8	17 42.8	152.80	+ 0.10	9.9927186	6.8	4 46 59.03
9	9	289 19 7.0	18 49.8	152.79	- 0.03	9.9927364	8.0	4 43 3.12
10	10	290 20 13.8	19 56.4	152.78	- 0.15	9.9927570	+ 9.2	4 39 7.20
11	11	291 21 20.6	21 3.0	152.78	0.27	9.9927803	10.3	4 35 11.29
12	12	292 22 27.2	22 9.4	152.77	0.36	9.9928061	11.4	4 31 15.38
13	13	293 23 33.5	23 15.6	152.76	- 0.44	9.9928348	+12.4	4 27 19.47
14	14	294 24 39.7	24 21.6	152.75	0.48	9.9928656	13.3	4 23 23.56
15	15	295 25 45.7	25 27.4	152.74	0.48	9.9928988	14.2	4 19 27.64
16	16	296 26 51.4	26 32.9	152.73	- 0.46	9.9929340	+15.1	4 15 31.73
17	17	297 27 56.9	27 38.2	152.72	0.41	9.9929714	15.9	4 11 35.82
18	18	298 29 2.2	28 43.4	152.70	0.34	9.9930106	16.7	4 7 39.91
19	19	299 30 6.9	29 47.9	152.68	- 0.25	9.9930515	+17.4	4 3 44.00
20	20	300 31 11.0	30 51.8	152.66	- 0.12	9.9930942	18.1	3 59 48.09
21	21	301 32 14.7	31 55.3	152.64	0.00	9.9931385	18.7	3 55 52.18
22	22	302 33 17.7	32 58.2	152.61	+ 0.13	9.9931841	+19.3	3 51 56.26
23	23	303 34 19.8	34 0.1	152.58	0.26	9.9932313	19.9	3 48 0.35
24	24	304 35 21.1	35 1.3	152.54	0.38	9.9932801	20.5	3 44 4.44
25	25	305 36 21.5	36 1.5	152.50	+ 0.48	9.9933301	+21.2	3 40 8.53
26	26	306 37 20.8	37 0.7	152.45	0.57	9.9933819	21.9	3 36 12.62
27	27	307 38 18.9	37 58.6	152.40	0.62	9.9934352	22.6	3 32 16.71
28	28	308 39 15.8	38 55.4	152.35	+ 0.65	9.9934903	+23.3	3 28 20.80
29	29	309 40 11.4	39 50.8	152.29	0.64	9.9935471	24.0	3 24 24.89
30	30	310 41 5.7	40 45.0	152.23	0.61	9.9936058	24.8	3 20 28.98
31	31	311 41 58.7	41 37.8	152.17	0.55	9.9936664	25.7	3 16 33.07
32	32	312 42 50.3	42 29.3	152.11	+ 0.46	9.9937293	+26.7	3 12 37.16
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>h</sup> .								Diff. for 1 Hour, —9 <sup>h</sup> .8296. (Table II.)

GREENWICH MEAN TIME.									
Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	14 56.0	14 52.6	54 41.6	-1.14	54 29.1	-0.94	7 13.1	1.87	8.7
2	14 49.8	14 47.7	54 19.0	0.75	54 11.2	0.56	7 58.8	1.94	9.7
3	14 46.2	14 45.2	54 5.6	0.38	54 2.0	-0.21	8 46.4	2.02	10.7
4	14 44.8	14 44.9	54 0.4	-0.05	54 0.7	+0.10	9 35.8	2.09	11.7
5	14 45.4	14 46.4	54 2.7	+0.23	54 6.2	0.35	10 26.3	2.11	12.7
6	14 47.7	14 49.4	54 11.0	0.46	54 17.2	0.56	11 17.0	2.10	13.7
7	14 51.3	14 53.6	54 24.5	+0.65	54 32.9	+0.74	12 6.7	2.04	14.7
8	14 56.2	14 59.0	54 42.2	0.82	54 52.5	0.89	12 54.9	1.97	15.7
9	15 2.0	15 5.2	55 3.6	0.96	55 15.5	1.03	13 41.2	1.89	16.7
10	15 8.7	15 12.4	55 28.3	+1.10	55 41.8	+1.16	14 25.9	1.84	17.7
11	15 16.3	15 20.4	55 56.2	1.23	56 11.4	1.30	15 9.7	1.82	18.7
12	15 24.8	15 29.4	56 27.5	1.38	56 44.4	1.44	15 53.5	1.84	19.7
13	15 34.3	15 39.3	57 2.1	+1.50	57 20.5	+1.57	16 38.5	1.91	20.7
14	15 44.5	15 49.8	57 39.7	1.62	57 59.3	1.65	17 25.8	2.04	21.7
15	15 55.3	16 0.7	58 19.3	1.67	58 39.4	1.66	18 16.7	2.21	22.7
16	16 6.1	16 11.4	58 59.2	+1.63	59 18.5	+1.56	19 12.2	2.41	23.7
17	16 16.3	16 20.9	59 36.7	1.45	59 53.4	1.31	20 12.5	2.60	24.7
18	16 24.9	16 28.2	60 8.2	1.13	60 20.4	0.90	21 16.3	2.70	25.7
19	16 30.8	16 32.4	60 29.7	+0.63	60 35.5	+0.33	22 21.1	2.68	26.7
20	16 33.0	16 32.4	60 37.7	+0.01	60 35.8	-0.33	23 23.9	2.54	27.7
21	16 30.8	16 28.1	60 29.9	-0.66	60 20.0	0.99	6		28.7
22	16 24.4	16 19.7	60 6.2	-1.29	59 49.0	-1.56	0 22.7	2.35	0.2
23	16 14.2	16 7.9	59 28.7	1.80	59 5.8	1.98	1 16.8	2.16	1.2
24	16 1.2	15 54.1	58 41.1	2.12	58 15.0	2.20	2 6.7	2.01	2.2
25	15 46.8	15 39.5	57 48.2	-2.24	57 21.3	-2.22	2 53.6	1.91	3.2
26	15 32.3	15 25.3	56 54.9	2.16	56 29.4	2.07	3 38.6	1.85	4.2
27	15 18.8	15 12.7	56 5.2	1.94	55 42.9	1.78	4 23.0	1.85	5.2
28	15 7.1	15 2.2	55 22.5	-1.61	55 4.3	-1.41	5 7.6	1.87	6.2
29	14 57.9	14 54.3	54 48.6	1.21	54 35.3	0.99	5 53.4	1.94	7.2
30	14 51.4	14 49.2	54 24.7	0.78	54 16.7	0.57	6 40.7	2.01	8.2
31	14 47.7	14 46.9	54 11.2	-0.35	54 8.3	-0.14	7 29.6	2.07	9.2
32	14 46.8	14 47.3	54 7.8	+0.05	54 9.5	+0.23	8 19.7	2.11	10.2

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 1.					MONDAY 3.				
0	h 44 42.37	1.9575	N.16 28 0.7	10.652	0	h 3 21 52.67	2.0969	N.23 20 55.4	6.306
1	1 46 39.89	1.9598	16 38 37.6	10.577	1	3 23 58.58	2.1000	23 27 10.6	6.200
2	1 48 37.55	1.9623	16 49 9.9	10.500	2	3 26 4.67	2.1030	23 33 19.4	6.093
3	1 50 35.36	1.9648	16 59 37.6	10.423	3	3 28 10.94	2.1060	23 39 21.8	5.986
4	1 52 33.32	1.9672	17 10 0.7	10.347	4	3 30 17.39	2.1089	23 45 17.7	5.878
5	1 54 31.42	1.9697	17 20 19.2	10.269	5	3 32 24.01	2.1118	23 51 7.1	5.769
6	1 56 29.68	1.9723	17 30 33.0	10.190	6	3 34 30.81	2.1148	23 56 50.0	5.661
7	1 58 28.09	1.9748	17 40 42.0	10.111	7	3 36 37.79	2.1177	24 2 26.4	5.552
8	2 0 26.65	1.9774	17 50 46.3	10.032	8	3 38 44.94	2.1206	24 7 56.2	5.442
9	2 2 25.38	1.9801	18 0 45.8	9.951	9	3 40 52.26	2.1234	24 13 19.4	5.331
10	2 4 24.26	1.9827	18 10 40.4	9.869	10	3 42 59.75	2.1263	24 18 35.9	5.220
11	2 6 23.30	1.9854	18 20 30.1	9.788	11	3 45 7.41	2.1291	24 23 45.8	5.108
12	2 8 22.51	1.9882	18 30 14.9	9.705	12	3 47 15.24	2.1318	24 28 48.9	4.996
13	2 10 21.88	1.9909	18 39 54.7	9.622	13	3 49 23.23	2.1345	24 33 45.3	4.883
14	2 12 21.42	1.9938	18 49 29.5	9.538	14	3 51 31.38	2.1373	24 38 34.9	4.770
15	2 14 21.13	1.9966	18 58 59.2	9.453	15	3 53 39.70	2.1399	24 43 17.7	4.657
16	2 16 21.01	1.9994	19 8 23.9	9.368	16	3 55 48.17	2.1425	24 47 53.7	4.543
17	2 18 21.06	2.0023	19 17 43.4	9.283	17	3 57 56.80	2.1452	24 52 22.8	4.428
18	2 20 21.28	2.0052	19 26 57.8	9.197	18	4 0 5.59	2.1478	24 56 45.0	4.313
19	2 22 21.68	2.0081	19 36 7.0	9.109	19	4 2 14.53	2.1503	25 1 0.3	4.197
20	2 24 22.25	2.0110	19 45 10.9	9.022	20	4 4 23.62	2.1527	25 5 8.6	4.080
21	2 26 23.00	2.0140	19 54 9.6	8.933	21	4 6 32.85	2.1551	25 9 9.9	3.963
22	2 28 23.93	2.0170	20 3 2.9	8.844	22	4 8 42.23	2.1575	25 13 4.2	3.847
23	2 30 25.04	2.0200	N.20 11 50.9	8.755	23	4 10 51.75	2.1598	N.25 16 51.5	3.729
SUNDAY 2.					TUESDAY 4.				
0	2 32 26.33	2.0230	N.20 20 33.5	8.664	0	4 13 1.41	2.1622	N.25 20 31.7	3.611
1	2 34 27.80	2.0260	20 29 10.6	8.573	1	4 15 11.21	2.1644	25 24 4.8	3.493
2	2 36 29.45	2.0290	20 37 42.3	8.482	2	4 17 21.14	2.1666	25 27 30.8	3.374
3	2 38 31.28	2.0321	20 46 8.4	8.389	3	4 19 31.20	2.1688	25 30 49.7	3.255
4	2 40 33.30	2.0352	20 54 29.0	8.297	4	4 21 41.39	2.1708	25 34 1.4	3.135
5	2 42 35.50	2.0383	21 2 44.0	8.203	5	4 23 51.70	2.1729	25 37 5.9	3.015
6	2 44 37.89	2.0413	21 10 53.4	8.109	6	4 26 2.14	2.1750	25 40 3.2	2.894
7	2 46 40.46	2.0444	21 18 57.1	8.014	7	4 28 12.70	2.1769	25 42 53.2	2.773
8	2 48 43.22	2.0475	21 26 55.1	7.918	8	4 30 23.37	2.1788	25 45 35.9	2.652
9	2 50 46.16	2.0506	21 34 47.3	7.823	9	4 32 34.16	2.1807	25 48 11.4	2.531
10	2 52 49.29	2.0537	21 42 33.8	7.726	10	4 34 45.05	2.1824	25 50 39.6	2.408
11	2 54 52.61	2.0568	21 50 14.4	7.628	11	4 36 56.05	2.1842	25 53 0.4	2.286
12	2 56 56.11	2.0599	21 57 49.2	7.531	12	4 39 7.15	2.1858	25 55 13.9	2.163
13	2 58 59.80	2.0631	22 5 18.1	7.432	13	4 41 18.35	2.1875	25 57 20.0	2.041
14	3 1 3.68	2.0662	22 12 41.0	7.332	14	4 43 29.65	2.1891	25 59 18.8	1.918
15	3 3 7.75	2.0693	22 19 57.9	7.232	15	4 45 41.04	2.1905	26 1 10.2	1.794
16	3 5 12.00	2.0724	22 27 8.8	7.132	16	4 47 52.51	2.1919	26 2 54.1	1.670
17	3 7 16.44	2.0755	22 34 13.7	7.031	17	4 50 4.07	2.1934	26 4 30.6	1.547
18	3 9 21.06	2.0786	22 41 12.5	6.929	18	4 52 15.72	2.1947	26 5 59.7	1.423
19	3 11 25.87	2.0817	22 48 5.2	6.827	19	4 54 27.44	2.1959	26 7 21.3	1.298
20	3 13 30.86	2.0848	22 54 51.7	6.723	20	4 56 39.23	2.1972	26 8 35.4	1.173
21	3 15 36.04	2.0878	23 1 32.0	6.620	21	4 58 51.10	2.1983	26 9 42.0	1.048
22	3 17 41.40	2.0909	23 8 6.1	6.516	22	5 1 3.03	2.1993	26 10 41.2	0.923
23	3 19 46.95	2.0939	23 14 33.9	6.411	23	5 3 15.02	2.2004	26 11 32.8	0.797
24	3 21 52.67	2.0969	N.23 20 55.4	6.306	24	5 5 27.08	2.2014	N.26 12 16.8	0.672

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 5.					FRIDAY 7.				
0	5 5 27.08	2.2014	N.26 12 16.8	0.672	0	6 50 54.87	2.1683	N.24 19 49.4	5.895
1	5 7 39.19	2.2022	26 12 53.4	0.547	1	6 53 4.91	2.1662	24 14 28.2	5.413
2	5 9 51.34	2.2029	26 13 22.4	0.420	2	6 55 14.82	2.1641	24 8 59.9	5.530
3	5 12 3.54	2.2037	26 13 43.8	0.294	3	6 57 24.60	2.1618	24 3 24.6	5.647
4	5 14 15.78	2.2043	26 13 57.7	0.168	4	6 59 34.24	2.1596	23 57 42.3	5.763
5	5 16 28.06	2.2050	26 14 4.0	+0.043	5	7 1 43.75	2.1573	23 51 53.1	5.878
6	5 18 40.38	2.2056	26 14 2.8	-0.084	6	7 3 53.12	2.1549	23 45 56.9	5.993
7	5 20 52.73	2.2060	26 13 53.9	0.211	7	7 6 2.34	2.1525	23 39 53.9	6.108
8	5 23 5.10	2.2063	26 13 37.5	0.337	8	7 8 11.42	2.1501	23 33 44.0	6.222
9	5 25 17.49	2.2067	26 13 13.5	0.463	9	7 10 20.35	2.1477	23 27 27.3	6.335
10	5 27 29.90	2.2070	26 12 41.9	0.590	10	7 12 29.14	2.1452	23 21 3.8	6.448
11	5 29 42.33	2.2072	26 12 2.7	0.717	11	7 14 37.77	2.1426	23 14 33.6	6.560
12	5 31 54.76	2.2073	26 11 15.9	0.843	12	7 16 46.25	2.1400	23 7 56.6	6.672
13	5 34 7.20	2.2073	26 10 21.5	0.970	13	7 18 54.57	2.1374	23 1 13.0	6.783
14	5 36 19.64	2.2073	26 9 19.5	1.097	14	7 21 2.74	2.1348	22 54 22.7	6.893
15	5 38 32.08	2.2073	26 8 9.9	1.223	15	7 23 10.75	2.1322	22 47 25.8	7.003
16	5 40 44.51	2.2071	26 6 52.7	1.350	16	7 25 18.60	2.1295	22 40 22.3	7.113
17	5 42 56.93	2.2068	26 5 27.9	1.477	17	7 27 26.29	2.1268	22 33 12.3	7.221
18	5 45 9.33	2.2066	26 3 55.5	1.603	18	7 29 33.81	2.1240	22 25 55.8	7.329
19	5 47 21.72	2.2063	26 2 15.6	1.728	19	7 31 41.17	2.1213	22 18 32.8	7.437
20	5 49 34.08	2.2058	26 0 28.1	1.855	20	7 33 48.37	2.1185	22 11 3.4	7.543
21	5 51 46.41	2.2053	25 58 33.0	1.982	21	7 35 55.39	2.1157	22 3 27.7	7.648
22	5 53 58.71	2.2048	25 56 30.3	2.108	22	7 38 2.25	2.1129	21 55 45.6	7.754
23	5 56 10.98	2.2041	N.25 54 20.1	2.233	23	7 40 8.94	2.1100	N.21 47 57.2	7.859
THURSDAY 6.					SATURDAY 8.				
0	5 58 23.20	2.2033	N.25 52 2.4	2.358	0	7 42 15.45	2.1071	N.21 40 2.5	7.963
1	6 0 35.38	2.2027	25 49 37.1	2.484	1	7 44 21.79	2.1042	21 32 1.6	8.066
2	6 2 47.52	2.2018	25 47 4.3	2.609	2	7 46 27.96	2.1014	21 23 54.6	8.168
3	6 4 59.60	2.2009	25 44 24.0	2.734	3	7 48 33.96	2.0986	21 15 41.4	8.270
4	6 7 11.63	2.2000	25 41 36.2	2.859	4	7 50 39.79	2.0957	21 7 22.2	8.371
5	6 9 23.60	2.1989	25 38 40.9	2.984	5	7 52 45.44	2.0927	20 58 56.9	8.472
6	6 11 35.50	2.1978	25 35 38.1	3.109	6	7 54 50.91	2.0898	20 50 25.6	8.572
7	6 13 47.34	2.1967	25 32 27.8	3.233	7	7 56 56.21	2.0868	20 41 48.3	8.671
8	6 15 59.11	2.1955	25 29 10.1	3.357	8	7 59 1.33	2.0838	20 33 5.1	8.769
9	6 18 10.80	2.1942	25 25 45.0	3.481	9	8 1 6.27	2.0808	20 24 16.0	8.867
10	6 20 22.41	2.1928	25 22 12.4	3.604	10	8 3 11.03	2.0779	20 15 21.1	8.963
11	6 22 33.94	2.1915	25 18 32.5	3.727	11	8 5 15.62	2.0751	20 6 20.4	9.059
12	6 24 45.39	2.1901	25 14 45.2	3.850	12	8 7 20.04	2.0721	19 57 14.0	9.154
13	6 26 56.75	2.1885	25 10 50.5	3.973	13	8 9 24.27	2.0691	19 48 1.9	9.249
14	6 29 8.01	2.1869	25 6 48.5	4.095	14	8 11 28.33	2.0662	19 38 44.1	9.343
15	6 31 19.18	2.1853	25 2 39.1	4.217	15	8 13 32.21	2.0633	19 29 20.7	9.436
16	6 33 30.25	2.1837	24 58 22.5	4.338	16	8 15 35.92	2.0603	19 19 51.8	9.528
17	6 35 41.22	2.1819	24 53 58.6	4.459	17	8 17 39.45	2.0573	19 10 17.4	9.618
18	6 37 52.08	2.1802	24 49 27.4	4.580	18	8 19 42.80	2.0543	19 0 37.6	9.709
19	6 40 2.84	2.1783	24 44 49.0	4.700	19	8 21 45.97	2.0514	18 50 52.3	9.800
20	6 42 13.48	2.1764	24 40 3.4	4.820	20	8 23 48.97	2.0485	18 41 1.6	9.889
21	6 44 24.01	2.1745	24 35 10.6	4.939	21	8 25 51.79	2.0456	18 31 5.6	9.977
22	6 46 34.42	2.1725	24 30 10.7	5.058	22	8 27 54.44	2.0427	18 21 4.4	10.063
23	6 48 44.71	2.1704	24 25 3.6	5.177	23	8 29 56.91	2.0398	18 10 58.0	10.151
24	6 50 54.87	2.1683	N.24 19 49.4	5.295	24	8 31 59.21	2.0369	N.18 0 46.3	10.238

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 9.					TUESDAY 11.				
0	8 31 59.21	2.0369	N. 18 0 46.3	10.238	0	10 6 59.03	1.9364	N. 8 26 31.2	13.362
1	8 34 1.34	2.0341	17 50 29.5	10.322	1	10 8 55.19	1.9355	8 13 8.2	13.405
2	8 36 3.30	2.0313	17 40 7.7	10.405	2	10 10 51.29	1.9347	7 59 42.6	13.448
3	8 38 5.09	2.0284	17 29 40.9	10.488	3	10 12 47.35	1.9338	7 46 14.4	13.491
4	8 40 6.71	2.0257	17 19 9.1	10.572	4	10 14 43.35	1.9330	7 32 43.7	13.533
5	8 42 8.17	2.0229	17 8 32.3	10.653	5	10 16 39.31	1.9323	7 19 10.5	13.573
6	8 44 9.46	2.0201	16 57 50.7	10.734	6	10 18 35.23	1.9317	7 5 35.0	13.612
7	8 46 10.58	2.0173	16 47 4.2	10.814	7	10 20 31.11	1.9311	6 51 57.1	13.651
8	8 48 11.54	2.0147	16 36 13.0	10.893	8	10 22 26.96	1.9306	6 38 16.9	13.688
9	8 50 12.34	2.0120	16 25 17.1	10.971	9	10 24 22.78	1.9302	6 24 34.5	13.725
10	8 52 12.98	2.0095	16 14 16.5	11.049	10	10 26 18.58	1.9298	6 10 49.9	13.761
11	8 54 13.46	2.0067	16 3 11.2	11.126	11	10 28 14.35	1.9294	5 57 3.2	13.795
12	8 56 13.78	2.0041	15 52 1.4	11.202	12	10 30 10.11	1.9292	5 43 14.5	13.829
13	8 58 13.95	2.0015	15 40 47.0	11.277	13	10 32 5.85	1.9289	5 29 23.7	13.863
14	9 0 13.96	1.9989	15 29 28.2	11.350	14	10 34 1.58	1.9288	5 15 30.9	13.896
15	9 2 13.82	1.9964	15 18 5.0	11.423	15	10 35 57.31	1.9288	5 1 36.2	13.928
16	9 4 13.53	1.9939	15 6 37.4	11.497	16	10 37 53.03	1.9288	4 47 39.6	13.958
17	9 6 13.09	1.9914	14 55 5.4	11.568	17	10 39 48.76	1.9288	4 33 41.3	13.987
18	9 8 12.50	1.9890	14 43 29.2	11.639	18	10 41 44.49	1.9289	4 19 41.2	14.016
19	9 10 11.77	1.9867	14 31 48.7	11.709	19	10 43 40.23	1.9291	4 5 39.4	14.044
20	9 12 10.90	1.9843	14 20 4.1	11.778	20	10 45 35.98	1.9294	3 51 35.9	14.071
21	9 14 9.89	1.9820	14 8 15.3	11.847	21	10 47 31.76	1.9298	3 37 30.9	14.096
22	9 16 8.74	1.9798	13 56 22.5	11.913	22	10 49 27.56	1.9302	3 23 24.4	14.121
23	9 18 7.46	1.9775	N. 13 44 25.7	11.980	23	10 51 23.38	1.9307	N. 3 9 16.4	14.146
MONDAY 10.					WEDNESDAY 12.				
0	9 20 6.04	1.9753	N. 13 32 24.9	12.046	0	10 53 19.24	1.9313	N. 2 55 6.9	14.169
1	9 22 4.49	1.9731	13 20 20.2	12.110	1	10 55 15.13	1.9318	2 40 56.1	14.191
2	9 24 2.81	1.9710	13 8 11.7	12.174	2	10 57 11.06	1.9325	2 26 44.0	14.213
3	9 26 1.01	1.9689	12 55 59.3	12.238	3	10 59 7.03	1.9333	2 12 30.6	14.233
4	9 27 59.08	1.9668	12 43 43.2	12.300	4	11 1 3.05	1.9342	1 58 16.1	14.252
5	9 29 57.03	1.9649	12 31 23.3	12.362	5	11 2 59.13	1.9351	1 44 0.4	14.270
6	9 31 54.87	1.9630	12 18 59.8	12.422	6	11 4 55.26	1.9360	1 29 43.7	14.288
7	9 33 52.59	1.9610	12 6 32.7	12.482	7	11 6 51.45	1.9371	1 15 25.9	14.305
8	9 35 50.19	1.9592	11 54 2.0	12.540	8	11 8 47.71	1.9383	1 1 7.1	14.321
9	9 37 47.69	1.9574	11 41 27.9	12.598	9	11 10 44.04	1.9395	0 46 47.4	14.335
10	9 39 45.08	1.9557	11 28 50.3	12.655	10	11 12 40.45	1.9408	0 32 26.9	14.348
11	9 41 42.37	1.9539	11 16 9.3	12.712	11	11 14 36.94	1.9422	0 18 5.6	14.362
12	9 43 39.55	1.9523	11 3 24.9	12.767	12	11 16 33.51	1.9436	N. 0 3 43.5	14.373
13	9 45 36.64	1.9507	10 50 37.3	12.821	13	11 18 30.17	1.9451	S. 0 10 39.2	14.384
14	9 47 33.63	1.9491	10 37 46.4	12.874	14	11 20 26.92	1.9467	0 25 2.6	14.394
15	9 49 30.53	1.9476	10 24 52.4	12.927	15	11 22 23.77	1.9483	0 39 26.5	14.403
16	9 51 27.34	1.9462	10 11 55.2	12.979	16	11 24 20.72	1.9501	0 53 51.0	14.412
17	9 53 24.07	1.9448	9 58 54.9	13.030	17	11 26 17.78	1.9519	1 8 15.9	14.418
18	9 55 20.72	1.9434	9 45 51.6	13.080	18	11 28 14.95	1.9538	1 22 41.1	14.423
19	9 57 17.28	1.9421	9 32 45.3	13.129	19	11 30 12.23	1.9558	1 37 6.7	14.429
20	9 59 13.77	1.9409	9 19 36.1	13.177	20	11 32 9.64	1.9578	1 51 32.6	14.433
21	10 1 10.19	1.9398	9 6 24.1	13.224	21	11 34 7.17	1.9599	2 5 58.7	14.436
22	10 3 6.54	1.9386	8 53 9.2	13.271	22	11 36 4.83	1.9622	2 20 24.9	14.438
23	10 5 2.82	1.9374	8 39 51.6	13.317	23	11 38 2.63	1.9645	2 34 51.2	14.438
24	10 6 59.03	1.9364	N. 8 26 31.2	13.362	24	11 40 0.57	1.9668	S. 2 49 17.5	14.433

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 13.					SATURDAY 15.				
0	11 40 0.57	1.9668	S. 2 49 17.5	14.438	0	13 18 41.16	2.1753	S. 14 0 42.7	13.062
1	11 41 58.65	1.9693	3 3 43.7	14.437	1	13 20 51.86	2.1815	14 13 44.6	13.001
2	11 43 56.88	1.9718	3 18 9.9	14.435	2	13 23 2.94	2.1876	14 26 42.8	12.938
3	11 45 55.27	1.9745	3 32 35.9	14.432	3	13 25 14.39	2.1941	14 39 37.2	12.874
4	11 47 53.82	1.9772	3 47 1.7	14.427	4	13 27 26.23	2.2006	14 52 27.7	12.808
5	11 49 52.53	1.9799	4 1 27.1	14.421	5	13 29 38.46	2.2071	15 5 14.2	12.741
6	11 51 51.41	1.9828	4 15 52.2	14.415	6	13 31 51.08	2.2137	15 17 56.6	12.672
7	11 53 50.46	1.9857	4 30 16.9	14.408	7	13 34 4.10	2.2203	15 30 34.8	12.602
8	11 55 49.69	1.9888	4 44 41.1	14.399	8	13 36 17.51	2.2269	15 43 8.8	12.531
9	11 57 49.11	1.9918	4 59 4.8	14.389	9	13 38 31.33	2.2337	15 55 38.5	12.458
10	11 59 48.71	1.9950	5 13 27.8	14.378	10	13 40 45.55	2.2404	16 8 3.7	12.382
11	12 1 48.51	1.9983	5 27 50.2	14.367	11	13 43 0.18	2.2473	16 20 24.3	12.305
12	12 3 48.51	2.0017	5 42 11.8	14.353	12	13 45 15.22	2.2542	16 32 40.3	12.227
13	12 5 48.71	2.0050	5 56 32.6	14.339	13	13 47 30.68	2.2611	16 44 51.5	12.147
14	12 7 49.11	2.0085	6 10 52.5	14.324	14	13 49 46.55	2.2681	16 56 57.9	12.065
15	12 9 49.73	2.0122	6 25 11.5	14.307	15	13 52 2.85	2.2753	17 8 59.4	11.983
16	12 11 50.57	2.0158	6 39 29.4	14.289	16	13 54 19.58	2.2823	17 20 55.9	11.898
17	12 13 51.63	2.0196	6 53 46.2	14.271	17	13 56 36.73	2.2894	17 32 47.2	11.811
18	12 15 52.92	2.0234	7 8 1.9	14.251	18	13 58 54.31	2.2966	17 44 33.2	11.723
19	12 17 54.44	2.0273	7 22 16.3	14.229	19	14 1 12.32	2.3038	17 56 13.9	11.633
20	12 19 56.19	2.0313	7 36 29.4	14.207	20	14 3 30.77	2.3112	18 7 49.2	11.542
21	12 21 58.19	2.0353	7 50 41.2	14.184	21	14 5 49.66	2.3184	18 19 19.0	11.449
22	12 24 0.43	2.0395	8 4 51.5	14.159	22	14 8 8.98	2.3258	18 30 43.1	11.354
23	12 26 2.93	2.0438	S. 8 19 0.3	14.133	23	14 10 28.75	2.3333	S. 18 42 1.5	11.258
FRIDAY 14.					SUNDAY 16.				
0	12 28 5.68	2.0481	S. 8 33 7.5	14.106	0	14 12 48.97	2.3407	S. 18 53 14.0	11.159
1	12 30 8.70	2.0525	8 47 13.0	14.078	1	14 15 9.63	2.3480	19 4 20.6	11.059
2	12 32 11.98	2.0569	9 1 16.8	14.048	2	14 17 30.73	2.3555	19 15 21.1	10.957
3	12 34 15.53	2.0615	9 15 18.8	14.017	3	14 19 52.29	2.3630	19 26 15.4	10.853
4	12 36 19.36	2.0662	9 29 18.9	13.985	4	14 22 14.29	2.3704	19 37 3.5	10.748
5	12 38 23.47	2.0708	9 43 17.0	13.952	5	14 24 36.74	2.3780	19 47 45.2	10.641
6	12 40 27.86	2.0756	9 57 13.1	13.918	6	14 26 59.65	2.3856	19 58 20.4	10.533
7	12 42 32.54	2.0805	10 11 7.1	13.882	7	14 29 23.01	2.3932	20 8 49.1	10.423
8	12 44 37.52	2.0855	10 24 58.9	13.844	8	14 31 46.83	2.4008	20 19 11.1	10.310
9	12 46 42.80	2.0906	10 38 48.4	13.806	9	14 34 11.10	2.4083	20 29 26.3	10.196
10	12 48 48.39	2.0957	10 52 35.6	13.766	10	14 36 35.83	2.4159	20 39 34.6	10.079
11	12 50 54.28	2.1008	11 6 20.3	13.724	11	14 39 1.01	2.4234	20 49 35.8	9.962
12	12 53 0.49	2.1062	11 20 2.5	13.682	12	14 41 26.64	2.4310	20 59 30.0	9.843
13	12 55 7.02	2.1115	11 33 42.1	13.638	13	14 43 52.73	2.4387	21 9 17.0	9.722
14	12 57 13.87	2.1169	11 47 19.0	13.593	14	14 46 19.28	2.4463	21 18 56.6	9.598
15	12 59 21.05	2.1224	12 0 53.2	13.546	15	14 48 46.28	2.4538	21 28 28.8	9.474
16	13 1 28.56	2.1280	12 14 24.5	13.498	16	14 51 13.74	2.4614	21 37 53.5	9.348
17	13 3 36.41	2.1337	12 27 52.9	13.448	17	14 53 41.65	2.4689	21 47 10.5	9.219
18	13 5 44.60	2.1394	12 41 18.3	13.398	18	14 56 10.01	2.4765	21 56 19.8	9.089
19	13 7 53.14	2.1453	12 54 40.6	13.345	19	14 58 38.83	2.4840	22 5 21.2	8.958
20	13 10 2.03	2.1511	13 7 59.7	13.292	20	15 1 8.09	2.4914	22 14 14.7	8.824
21	13 12 11.27	2.1570	13 21 15.6	13.237	21	15 3 37.80	2.4988	22 23 0.1	8.688
22	13 14 20.87	2.1630	13 34 28.1	13.180	22	15 6 7.95	2.5063	22 31 37.3	8.552
23	13 16 30.83	2.1691	13 47 37.2	13.122	23	15 8 38.55	2.5137	22 40 6.3	8.413
24	13 18 41.16	2.1753	S. 14 0 42.7	13.062	24	15 11 9.59	2.5210	S. 22 48 26.9	8.273



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 17.					WEDNESDAY 19.				
0	15 11 9.59	2.5210	S. 22 48 26.9	8.273	0	17 18 55.66	2.7518	S. 26 14 44.8	+0.133
1	15 13 41.07	2.5283	22 56 39.0	8.130	1	17 21 40.80	2.7588	26 14 30.9	0.329
2	15 16 12.98	2.5355	23 4 42.5	7.986	2	17 24 25.99	2.7535	26 14 5.3	0.526
3	15 18 45.33	2.5427	23 12 37.3	7.840	3	17 27 11.22	2.7541	26 13 27.8	0.723
4	15 21 18.10	2.5498	23 20 23.3	7.693	4	17 29 56.48	2.7545	26 12 38.5	0.920
5	15 23 51.30	2.5569	23 28 0.5	7.544	5	17 32 41.76	2.7547	26 11 37.4	1.118
6	15 26 24.93	2.5639	23 35 28.6	7.393	6	17 35 27.04	2.7547	26 10 24.4	1.314
7	15 28 58.97	2.5708	23 42 47.6	7.241	7	17 38 12.32	2.7545	26 8 59.7	1.511
8	15 31 33.43	2.5777	23 49 57.5	7.087	8	17 40 57.58	2.7541	26 7 23.1	1.708
9	15 34 8.30	2.5845	23 56 58.1	6.932	9	17 43 42.81	2.7536	26 5 34.7	1.905
10	15 36 43.57	2.5912	24 3 49.3	6.774	10	17 46 28.01	2.7528	26 3 34.5	2.101
11	15 39 19.24	2.5978	24 10 31.0	6.615	11	17 49 13.15	2.7518	26 1 22.6	2.297
12	15 41 55.31	2.6044	24 17 3.1	6.454	12	17 51 58.22	2.7506	25 58 58.9	2.493
13	15 44 31.77	2.6108	24 23 25.5	6.293	13	17 54 43.22	2.7493	25 56 23.4	2.689
14	15 47 8.61	2.6172	24 29 38.2	6.129	14	17 57 28.13	2.7477	25 53 36.2	2.883
15	15 49 45.83	2.6235	24 35 41.0	5.964	15	18 0 12.94	2.7460	25 50 37.4	3.078
16	15 52 23.43	2.6297	24 41 33.9	5.798	16	18 2 57.65	2.7442	25 47 26.9	3.273
17	15 55 1.39	2.6357	24 47 16.7	5.629	17	18 5 42.24	2.7420	25 44 4.7	3.466
18	15 57 39.71	2.6416	24 52 49.4	5.460	18	18 8 26.69	2.7397	25 40 31.0	3.658
19	16 0 18.38	2.6474	24 58 11.9	5.289	19	18 11 11.00	2.7373	25 36 45.8	3.850
20	16 2 57.40	2.6532	25 3 24.1	5.117	20	18 13 55.16	2.7347	25 32 49.0	4.042
21	16 5 36.76	2.6588	25 8 25.9	4.943	21	18 16 39.16	2.7319	25 28 40.8	4.232
22	16 8 16.45	2.6642	25 13 17.3	4.768	22	18 19 22.99	2.7289	25 24 21.2	4.422
23	16 10 56.46	2.6695	S. 25 17 58.1	4.592	23	18 22 6.63	2.7258	S. 25 19 50.2	4.610
TUESDAY 18.					THURSDAY 20.				
0	16 13 36.79	2.6748	S. 25 22 28.3	4.414	0	18 24 50.08	2.7224	S. 25 15 8.0	4.798
1	16 16 17.43	2.6798	25 26 47.8	4.235	1	18 27 33.32	2.7189	25 10 14.5	4.985
2	16 18 58.37	2.6848	25 30 56.5	4.055	2	18 30 16.35	2.7153	25 5 9.8	5.172
3	16 21 39.60	2.6895	25 34 54.4	3.874	3	18 32 59.15	2.7114	24 59 53.9	5.357
4	16 24 21.11	2.6941	25 38 41.4	3.692	4	18 35 41.72	2.7075	24 54 27.0	5.540
5	16 27 2.89	2.6985	25 42 17.4	3.508	5	18 38 24.05	2.7033	24 48 49.1	5.723
6	16 29 44.93	2.7028	25 45 42.4	3.324	6	18 41 6.12	2.6990	24 43 0.3	5.904
7	16 32 27.23	2.7071	25 48 56.3	3.138	7	18 43 47.93	2.6946	24 37 0.6	6.084
8	16 35 9.78	2.7111	25 51 59.0	2.952	8	18 46 29.47	2.6901	24 30 50.2	6.263
9	16 37 52.56	2.7149	25 54 50.5	2.764	9	18 49 10.74	2.6854	24 24 29.0	6.442
10	16 40 35.57	2.7187	25 57 30.7	2.576	10	18 51 51.72	2.6805	24 17 57.2	6.618
11	16 43 18.80	2.7222	25 59 59.6	2.387	11	18 54 32.40	2.6755	24 11 14.9	6.793
12	16 46 2.23	2.7255	26 2 17.2	2.198	12	18 57 12.78	2.6703	24 4 22.1	6.967
13	16 48 45.86	2.7288	26 4 23.3	2.006	13	18 59 52.84	2.6651	23 57 18.9	7.138
14	16 51 29.68	2.7318	26 6 17.9	1.814	14	19 2 32.59	2.6598	23 50 5.5	7.308
15	16 54 13.67	2.7345	26 8 1.0	1.622	15	19 5 12.01	2.6543	23 42 41.9	7.478
16	16 56 57.82	2.7372	26 9 32.6	1.429	16	19 7 51.10	2.6487	23 35 8.2	7.645
17	16 59 42.13	2.7397	26 10 52.5	1.235	17	19 10 29.85	2.6429	23 27 24.5	7.812
18	17 2 26.58	2.7419	26 12 0.8	1.041	18	19 13 8.25	2.6371	23 19 30.8	7.977
19	17 5 11.16	2.7441	26 12 57.4	0.847	19	19 15 46.30	2.6312	23 11 27.3	8.138
20	17 7 55.87	2.7460	26 13 42.4	0.652	20	19 18 23.99	2.6251	23 3 14.2	8.299
21	17 10 40.68	2.7477	26 14 15.6	0.456	21	19 21 1.31	2.6189	22 54 51.4	8.459
22	17 13 25.59	2.7493	26 14 37.1	0.261	22	19 23 38.26	2.6127	22 46 19.1	8.617
23	17 16 10.59	2.7506	26 14 46.9	-0.064	23	19 26 14.83	2.6063	22 37 37.4	8.773
24	17 18 55.66	2.7518	S. 26 14 44.8	+0.133	24	19 28 51.02	2.5999	S. 22 28 46.4	8.927

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 21.					SUNDAY 23.				
0	19 28 51.02	2.5999	S. 22 28 46.4	8.927	0	21 25 28.87	2.2592	S. 12 59 38.5	14.016
1	19 31 26.82	2.5934	22 19 46.2	9.079	1	21 27 44.22	2.2526	12 45 35.8	14.073
2	19 34 2.23	2.5868	22 10 36.9	9.229	2	21 29 59.18	2.2461	12 31 29.7	14.139
3	19 36 37.24	2.5802	22 1 18.7	9.378	3	21 32 13.75	2.2396	12 17 20.3	14.183
4	19 39 11.85	2.5735	21 51 51.6	9.525	4	21 34 27.93	2.2331	12 3 7.7	14.235
5	19 41 46.06	2.5667	21 42 15.7	9.670	5	21 36 41.72	2.2267	11 48 52.1	14.285
6	19 44 19.86	2.5598	21 32 31.2	9.813	6	21 38 55.13	2.2204	11 34 33.5	14.333
7	19 46 53.24	2.5529	21 22 38.1	9.955	7	21 41 8.17	2.2143	11 20 12.1	14.380
8	19 49 26.21	2.5459	21 12 36.6	10.093	8	21 43 20.84	2.2081	11 5 47.9	14.425
9	19 51 58.75	2.5388	21 2 26.9	10.231	9	21 45 33.14	2.2019	10 51 21.1	14.467
10	19 54 30.87	2.5318	20 52 8.9	10.367	10	21 47 45.07	2.1958	10 36 51.8	14.508
11	19 57 2.57	2.5248	20 41 42.9	10.499	11	21 49 56.63	2.1895	10 22 20.1	14.547
12	19 59 33.84	2.5176	20 31 9.0	10.631	12	21 52 7.84	2.1833	10 7 46.1	14.585
13	20 2 4.68	2.5103	20 20 27.2	10.761	13	21 54 18.70	2.1771	9 53 9.9	14.621
14	20 4 35.08	2.5031	20 9 37.7	10.888	14	21 56 29.21	2.1723	9 38 31.6	14.655
15	20 7 5.05	2.4959	19 58 40.6	11.014	15	21 58 39.37	2.1665	9 23 51.3	14.688
16	20 9 34.59	2.4887	19 47 36.0	11.137	16	22 0 49.19	2.1609	9 9 9.0	14.719
17	20 12 3.69	2.4813	19 36 24.1	11.258	17	22 2 58.68	2.1554	8 54 25.0	14.748
18	20 14 32.34	2.4739	19 25 5.0	11.378	18	22 5 7.84	2.1499	8 39 39.3	14.776
19	20 17 0.56	2.4667	19 13 38.8	11.495	19	22 7 16.67	2.1444	8 24 51.9	14.803
20	20 19 28.34	2.4592	19 2 5.6	11.610	20	22 9 25.17	2.1391	8 10 3.0	14.827
21	20 21 55.67	2.4518	18 50 25.6	11.723	21	22 11 33.36	2.1338	7 55 12.7	14.849
22	20 24 22.56	2.4446	18 38 38.8	11.835	22	22 13 41.23	2.1286	7 40 21.1	14.870
23	20 26 49.02	2.4373	S. 18 26 45.4	11.944	23	22 15 48.79	2.1234	S. 7 25 28.3	14.889
SATURDAY 22.					MONDAY 24.				
0	20 29 15.03	2.4298	S. 18 14 45.5	12.052	0	22 17 56.04	2.1183	S. 7 10 34.4	14.907
1	20 31 40.60	2.4224	18 2 39.2	12.157	1	22 20 2.99	2.1134	6 55 39.4	14.924
2	20 34 5.72	2.4150	17 50 26.7	12.259	2	22 22 9.65	2.1086	6 40 43.5	14.939
3	20 36 30.40	2.4077	17 38 8.1	12.360	3	22 24 16.02	2.1038	6 25 46.7	14.953
4	20 38 54.64	2.4003	17 25 43.5	12.459	4	22 26 22.10	2.0990	6 10 49.1	14.965
5	20 41 18.44	2.3930	17 13 13.0	12.557	5	22 28 27.90	2.0943	5 55 50.9	14.975
6	20 43 41.80	2.3857	17 0 36.7	12.652	6	22 30 33.42	2.0897	5 40 52.1	14.985
7	20 46 4.72	2.3783	16 47 54.8	12.744	7	22 32 38.66	2.0852	5 25 52.7	14.993
8	20 48 27.20	2.3711	16 35 7.4	12.835	8	22 34 43.64	2.0807	5 10 52.9	14.999
9	20 50 49.25	2.3638	16 22 14.6	12.923	9	22 36 48.35	2.0763	4 55 52.8	15.003
10	20 53 10.86	2.3566	16 9 16.6	13.010	10	22 38 52.80	2.0721	4 40 52.5	15.007
11	20 55 32.04	2.3493	15 56 13.4	13.095	11	22 40 57.00	2.0679	4 25 52.0	15.009
12	20 57 52.78	2.3422	15 43 5.2	13.178	12	22 43 0.95	2.0638	4 10 51.4	15.010
13	21 0 13.10	2.3351	15 29 52.1	13.258	13	22 45 4.65	2.0597	3 55 50.8	15.009
14	21 2 32.99	2.3279	15 16 34.2	13.337	14	22 47 8.11	2.0558	3 40 50.3	15.007
15	21 4 52.45	2.3208	15 3 11.7	13.413	15	22 49 11.34	2.0519	3 25 49.9	15.004
16	21 7 11.49	2.3138	14 49 44.6	13.488	16	22 51 14.34	2.0481	3 10 49.8	14.999
17	21 9 30.11	2.3068	14 36 13.1	13.561	17	22 53 17.11	2.0443	2 55 50.0	14.993
18	21 11 48.31	2.2998	14 22 37.3	13.632	18	22 55 19.66	2.0407	2 40 50.6	14.987
19	21 14 6.09	2.2929	14 8 57.3	13.701	19	22 57 21.99	2.0371	2 25 51.6	14.978
20	21 16 23.46	2.2861	13 55 13.2	13.768	20	22 59 24.11	2.0337	2 10 53.2	14.968
21	21 18 40.42	2.2793	13 41 25.2	13.833	21	23 1 26.03	2.0302	1 55 55.4	14.957
22	21 20 56.97	2.2725	13 27 33.3	13.895	22	23 3 27.74	2.0268	1 40 58.3	14.946
23	21 23 13.12	2.2658	13 13 37.7	13.957	23	23 5 29.25	2.0236	1 26 1.9	14.933
24	21 25 28.87	2.2592	S. 12 59 38.5	14.016	24	23 7 30.57	2.0204	S. 1 11 6.3	14.918

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 25.					THURSDAY 27.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	23 7 30.57	2.0204	S. 1 11 6.3	14.918	1	0 42 15.65	1.9550	N. 10 8 31.6	13.047
2	23 9 31.70	2.0173	0 56 11.7	14.903	2	0 44 12.96	1.9553	10 21 32.7	12.988
3	23 11 32.65	2.0143	0 41 18.0	14.886	3	0 46 10.29	1.9557	10 34 30.2	12.928
4	23 13 33.42	2.0113	0 26 25.4	14.868	4	0 48 7.64	1.9560	10 47 24.0	12.867
5	23 15 34.01	2.0085	S. 0 11 33.9	14.849	5	0 50 5.01	1.9565	11 0 14.2	12.805
6	23 17 34.44	2.0058	N. 0 3 16.5	14.829	6	0 52 2.42	1.9571	11 13 0.6	12.742
7	23 19 34.70	2.0030	0 18 5.6	14.808	7	0 53 59.86	1.9577	11 25 43.3	12.679
8	23 21 34.80	2.0005	0 32 53.4	14.785	8	0 55 57.34	1.9583	11 38 22.1	12.615
9	23 23 34.74	1.9978	0 47 39.8	14.762	9	0 57 54.86	1.9591	11 50 57.1	12.551
10	23 25 34.53	1.9953	1 2 24.8	14.737	10	0 59 52.43	1.9598	12 3 28.2	12.485
11	23 27 34.18	1.9929	1 17 8.2	14.711	11	1 1 50.04	1.9606	12 15 55.3	12.419
12	23 29 33.68	1.9906	1 31 50.1	14.684	12	1 3 47.70	1.9615	12 28 18.5	12.352
13	23 31 33.05	1.9883	1 46 30.3	14.656	13	1 5 45.42	1.9624	12 40 37.6	12.285
14	23 33 32.28	1.9862	2 1 8.8	14.628	14	1 7 43.19	1.9634	12 52 52.7	12.217
15	23 35 31.39	1.9841	2 15 45.6	14.598	15	1 9 41.03	1.9645	13 5 3.6	12.148
16	23 37 30.37	1.9820	2 30 20.6	14.567	16	1 11 38.93	1.9655	13 17 10.4	12.078
17	23 39 29.23	1.9800	2 44 53.7	14.535	17	1 13 36.89	1.9667	13 29 13.0	12.008
18	23 41 27.97	1.9782	2 59 24.8	14.502	18	1 15 34.93	1.9679	13 41 11.4	11.937
19	23 43 26.61	1.9764	3 13 53.9	14.468	19	1 17 33.04	1.9691	13 53 5.5	11.866
20	23 45 25.14	1.9747	3 28 21.0	14.434	20	1 19 31.22	1.9703	14 4 55.3	11.794
21	23 47 23.57	1.9730	3 42 46.0	14.398	21	1 21 29.48	1.9717	14 16 40.8	11.721
22	23 49 21.90	1.9714	3 57 8.8	14.362	22	1 23 27.83	1.9732	14 28 21.8	11.648
23	23 51 20.14	1.9699	4 11 29.4	14.324	23	1 25 26.26	1.9746	14 39 58.5	11.574
24	23 53 18.29	1.9684	N. 4 25 47.7	14.285	24	1 27 24.78	1.9760	N. 14 51 30.7	11.499
WEDNESDAY 26.					FRIDAY 28.				
0	23 55 16.35	1.9671	N. 4 40 3.6	14.246	0	1 29 23.38	1.9775	N. 15 2 58.4	11.423
1	23 57 14.34	1.9658	4 54 17.2	14.206	1	1 31 22.08	1.9791	15 14 21.5	11.348
2	23 59 12.25	1.9646	5 8 28.3	14.164	2	1 33 20.87	1.9807	15 25 40.1	11.272
3	0 1 10.09	1.9634	5 22 36.9	14.122	3	1 35 19.76	1.9824	15 36 54.1	11.194
4	0 3 7.86	1.9623	5 36 43.0	14.080	4	1 37 18.76	1.9842	15 48 3.4	11.116
5	0 5 5.57	1.9614	5 50 46.5	14.036	5	1 39 17.86	1.9858	15 59 8.0	11.038
6	0 7 3.23	1.9605	6 4 47.3	13.991	6	1 41 17.06	1.9876	16 10 7.9	10.958
7	0 9 0.83	1.9596	6 18 45.4	13.946	7	1 43 16.37	1.9894	16 21 53.0	10.878
8	0 10 58.38	1.9588	6 32 40.8	13.900	8	1 45 15.79	1.9913	16 31 3.3	10.798
9	0 12 55.88	1.9580	6 46 33.4	13.853	9	1 47 15.32	1.9932	16 42 38.8	10.717
10	0 14 53.34	1.9573	7 0 23.1	13.804	10	1 49 14.97	1.9951	16 53 19.4	10.635
11	0 16 50.76	1.9568	7 14 9.9	13.754	11	1 51 14.73	1.9971	17 3 55.0	10.552
12	0 18 48.16	1.9563	7 27 53.6	13.704	12	1 53 14.62	1.9992	17 14 25.7	10.470
13	0 20 45.52	1.9558	7 41 34.4	13.655	13	1 55 14.63	2.0012	17 24 51.4	10.387
14	0 22 42.86	1.9554	7 55 12.2	13.604	14	1 57 14.76	2.0032	17 35 12.1	10.303
15	0 24 40.17	1.9551	8 8 46.9	13.552	15	1 59 15.01	2.0053	17 45 27.7	10.218
16	0 26 37.47	1.9548	8 22 18.4	13.498	16	2 1 15.39	2.0074	17 55 38.2	10.132
17	0 28 34.75	1.9546	8 35 46.7	13.445	17	2 3 15.90	2.0096	18 5 43.5	10.046
18	0 30 32.02	1.9545	8 49 11.8	13.391	18	2 5 16.54	2.0118	18 15 43.7	9.960
19	0 32 29.29	1.9544	9 2 33.6	13.335	19	2 7 17.32	2.0141	18 25 38.7	9.873
20	0 34 26.55	1.9543	9 15 52.0	13.279	20	2 9 18.23	2.0163	18 35 28.4	9.785
21	0 36 23.81	1.9544	9 29 7.1	13.223	21	2 11 19.28	2.0187	18 45 12.9	9.697
22	0 38 21.08	1.9546	9 42 18.8	13.166	22	2 13 20.47	2.0210	18 54 52.0	9.607
23	0 40 18.36	1.9548	9 55 27.0	13.107	23	2 15 21.80	2.0233	19 4 25.7	9.517
24	0 42 15.65	1.9550	N. 10 8 31.6	13.047	24	2 17 23.27	2.0257	N. 19 13 54.0	9.427

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 29.					MONDAY 31.				
0	h m s		° ' "		0	h m s		° ' "	
1	2 17 23.27	2.0257	N.19 13 54.0	9.427	1	3 57 33.88	2.1473	N.24 51 44.5	4.447
2	2 19 24.88	2.0281	19 23 16.9	9.337	2	3 59 42.78	2.1495	24 56 7.8	4.330
3	2 21 26.64	2.0305	19 32 34.4	9.245	3	4 1 51.82	2.1518	25 0 24.1	4.213
4	2 23 28.54	2.0329	19 41 46.3	9.153	4	4 4 0.99	2.1539	25 4 33.4	4.097
5	2 25 30.59	2.0353	19 50 52.7	9.061	5	4 6 10.29	2.1560	25 8 35.7	3.979
6	2 27 32.78	2.0378	19 59 53.6	8.967	6	4 8 19.71	2.1581	25 12 30.9	3.862
7	2 29 35.13	2.0404	20 8 48.8	8.873	7	4 10 29.26	2.1602	25 16 19.1	3.743
8	2 31 37.63	2.0429	20 17 38.4	8.780	8	4 12 38.93	2.1622	25 20 0.1	3.625
9	2 33 40.28	2.0454	20 26 22.4	8.685	9	4 14 48.72	2.1642	25 23 34.1	3.507
10	2 35 43.08	2.0480	20 35 0.6	8.589	10	4 16 58.63	2.1662	25 27 0.9	3.388
11	2 37 46.04	2.0506	20 43 33.1	8.493	11	4 19 8.66	2.1681	25 30 20.6	3.268
12	2 39 49.15	2.0531	20 51 59.8	8.396	12	4 21 18.80	2.1698	25 33 33.1	3.148
13	2 41 52.41	2.0557	21 0 20.6	8.298	13	4 23 29.04	2.1717	25 36 38.4	3.028
14	2 43 55.83	2.0583	21 8 35.6	8.202	14	4 25 39.40	2.1735	25 39 36.5	2.907
15	2 45 59.40	2.0608	21 16 44.8	8.104	15	4 27 49.86	2.1753	25 42 27.3	2.786
16	2 48 3.13	2.0635	21 24 48.1	8.005	16	4 30 0.43	2.1769	25 45 10.8	2.665
17	2 50 7.02	2.0662	21 32 45.4	7.905	17	4 32 11.09	2.1785	25 47 47.1	2.544
18	2 52 11.07	2.0688	21 40 36.7	7.805	18	4 34 21.85	2.1802	25 50 16.1	2.422
19	2 54 15.27	2.0713	21 48 22.0	7.704	19	4 36 32.71	2.1818	25 52 37.8	2.300
20	2 56 19.63	2.0740	21 56 1.2	7.603	20	4 38 43.66	2.1833	25 54 52.1	2.178
21	2 58 24.15	2.0767	22 3 34.4	7.502	21	4 40 54.70	2.1847	25 56 59.1	2.056
22	3 0 28.83	2.0793	22 11 1.5	7.400	22	4 43 5.82	2.1861	25 58 58.8	1.933
23	3 2 33.67	2.0820	22 18 22.4	7.297	23	4 45 17.03	2.1875	26 0 51.1	1.810
	3 4 38.67	2.0847	N.22 25 37.1	7.192		4 47 28.32	2.1888	N.26 2 36.0	1.687

SUNDAY 30.					TUESDAY, FEBRUARY 1.				
0	3 6 43.83	2.0873	N.22 32 45.5	7.088	0	4 49 39.68	2.1900	N.26 4 13.5	1.563
1	3 8 49.15	2.0899	22 39 47.7	6.985					
2	3 10 54.62	2.0925	22 46 43.7	6.881					
3	3 13 0.25	2.0952	22 53 33.4	6.775					
4	3 15 6.04	2.0978	23 0 16.7	6.668					
5	3 17 11.99	2.1004	23 6 53.6	6.562					
6	3 19 18.09	2.1030	23 13 24.1	6.455					
7	3 21 24.35	2.1057	23 19 48.2	6.348					
8	3 23 30.77	2.1083	23 26 5.9	6.240					
9	3 25 37.35	2.1109	23 32 17.0	6.131					
10	3 27 44.08	2.1134	23 38 21.6	6.022					
11	3 29 50.96	2.1159	23 44 19.7	5.913					
12	3 31 57.99	2.1185	23 50 11.1	5.802					
13	3 34 5.18	2.1211	23 55 55.9	5.692					
14	3 36 12.52	2.1235	24 1 34.1	5.582					
15	3 38 20.00	2.1259	24 7 5.7	5.470					
16	3 40 27.63	2.1284	24 12 30.5	5.358					
17	3 42 35.41	2.1309	24 17 48.6	5.245					
18	3 44 43.34	2.1333	24 22 59.9	5.132					
19	3 46 51.41	2.1358	24 28 4.5	5.019					
20	3 48 59.63	2.1381	24 33 2.2	4.905					
21	3 51 7.98	2.1404	24 37 53.1	4.791					
22	3 53 16.48	2.1428	24 42 37.1	4.676					
23	3 55 25.11	2.1450	24 47 14.2	4.562					
24	3 57 33.88	2.1473	N.24 51 44.5	4.447					

PHASES OF THE MOON.

○ Full Moon . . . . Jan. 7 12 24.3

☾ Last Quarter . . . . 15 3 44.5

● New Moon . . . . . 21 19 24.7

☾ First Quarter . . . . . 29 2 32.7

☾ Apogee . . . . . Jan. 4 4.3

☾ Perigee . . . . . 20 0.5

☾ Apogee . . . . . 31 20.7

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
1	SUN W.	108 57 21	3384	110 19 56	3392	111 42 22	3400	113 4 39	3408
	Fomalhaut W.	62 28 1	3510	63 48 14	3506	65 8 32	3501	66 28 55	3497
	α Pegasi W.	39 43 2	3379	41 5 42	3365	42 28 38	3353	43 51 48	3342
	Aldebaran E.	39 35 54	3152	38 8 47	3170	36 42 2	3189	35 15 40	3210
	Pollux E.	81 5 32	3025	79 35 50	3034	78 6 19	3041	76 36 57	3049
2	SUN W.	119 54 2	3438	121 15 35	3444	122 37 2	3448	123 58 24	3453
	Fomalhaut W.	73 11 47	3483	74 32 30	3482	75 53 14	3480	77 14 0	3480
	α Pegasi W.	50 50 22	3304	52 14 29	3298	53 38 43	3293	55 3 3	3288
	Pollux E.	69 12 15	3079	67 43 40	3085	66 15 12	3089	64 46 49	3094
	Regulus E.	106 5 59	3057	104 36 57	3062	103 8 1	3066	101 39 10	3069
3	Fomalhaut W.	83 58 5	3476	85 18 56	3476	86 39 47	3476	88 0 38	3476
	α Pegasi W.	62 5 55	3270	63 30 42	3265	64 55 34	3262	66 20 30	3259
	α Arietis W.	18 28 31	3218	19 54 19	3201	21 20 27	3188	22 46 51	3175
	Pollux E.	57 26 11	3112	55 58 16	3114	54 30 24	3117	53 2 35	3119
	Regulus E.	94 15 52	3082	92 47 21	3083	91 18 51	3085	89 50 23	3086
4	Fomalhaut W.	94 44 49	3479	96 5 37	3480	97 26 23	3481	98 47 8	3483
	α Pegasi W.	73 26 7	3242	74 51 26	3239	76 16 49	3236	77 42 16	3232
	α Arietis W.	30 1 51	3136	31 29 17	3130	32 56 50	3125	34 24 29	3119
	Pollux E.	45 44 10	3129	44 16 36	3131	42 49 4	3133	41 21 34	3134
	Regulus E.	82 28 10	3085	80 59 42	3084	79 31 13	3082	78 2 42	3082
5	α Pegasi W.	84 50 31	3215	86 16 22	3211	87 42 18	3208	89 8 18	3204
	α Arietis W.	41 44 18	3095	43 12 34	3091	44 40 55	3086	46 9 22	3081
	Pollux E.	34 4 42	3148	32 37 30	3152	31 10 23	3157	29 43 22	3163
	Regulus E.	70 39 36	3070	69 10 50	3067	67 42 0	3065	66 13 7	3060
	JUPITER E.	111 49 29	3114	110 21 37	3111	108 53 41	3107	107 25 40	3102
6	α Pegasi W.	96 19 24	3186	97 45 50	3183	99 12 20	3179	100 38 54	3177
	α Arietis W.	53 33 10	3055	55 2 15	3050	56 31 26	3044	58 0 44	3039
	Regulus E.	58 47 34	3042	57 18 13	3038	55 48 47	3034	54 19 16	3029
	JUPITER E.	100 4 16	3081	98 35 43	3075	97 7 3	3071	95 38 18	3065
	Spica E.	112 50 32	3040	111 21 9	3036	109 51 41	3031	108 22 7	3026
7	α Arietis W.	65 28 57	3010	66 58 57	3004	68 29 5	2998	69 59 20	2992
	Aldebaran W.	33 52 23	3180	35 18 56	3161	36 45 52	3143	38 13 9	3128
	Regulus E.	46 50 15	3005	45 20 9	3001	43 49 57	2996	42 19 39	2991
	JUPITER E.	88 12 54	3039	86 43 29	3033	85 13 57	3027	83 44 18	3021
	Spica E.	100 52 39	2999	99 22 25	2993	97 52 4	2988	96 21 36	2982
8	α Arietis W.	77 32 33	2961	79 3 35	2954	80 34 46	2947	82 6 5	2940
	Aldebaran W.	45 34 6	3059	47 3 6	3047	48 32 21	3035	50 1 50	3025
	Regulus E.	34 46 37	2967	33 15 43	2962	31 44 43	2958	30 13 37	2954
	JUPITER E.	76 14 13	2992	74 43 50	2985	73 13 19	2979	71 42 40	2973
	Spica E.	88 47 25	2952	87 16 12	2945	85 44 50	2939	84 13 21	2932
9	α Arietis W.	89 44 49	2906	91 17 0	2899	92 49 20	2893	94 21 48	2885
	Aldebaran W.	57 32 32	2973	59 3 18	2964	60 34 16	2954	62 5 26	2945
	JUPITER E.	64 7 32	2942	62 36 7	2936	61 4 34	2930	59 32 53	2924
	Spica E.	76 33 48	2899	75 1 28	2892	73 28 59	2885	71 56 21	2878

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
1	SUN W.	114 26 47	3415	115 48 47	3422	117 10 39	3428	118 32 24	3434
	Fomalhaut W.	67 49 23	3494	69 9 54	3490	70 30 29	3488	71 51 7	3486
	α Pegasi W.	45 15 11	3332	46 38 45	3324	48 2 29	3316	49 26 22	3310
	Aldebaran E.	33 49 43	3231	32 24 11	3256	30 59 8	3282	29 34 35	3311
	Pollux E.	75 7 45	3056	73 38 41	3062	72 9 45	3068	70 40 56	3074
2	SUN W.	125 19 41	3456	126 40 54	3459	128 2 4	3463	129 23 10	3464
	Fomalhaut W.	78 34 47	3478	79 55 36	3478	81 16 25	3477	82 37 15	3477
	α Pegasi W.	56 27 28	3284	57 51 58	3280	59 16 33	3276	60 41 12	3273
	Pollux E.	63 18 32	3098	61 50 20	3102	60 22 13	3105	58 54 10	3109
	Regulus E.	100 10 23	3075	98 41 40	3076	97 13 1	3078	95 44 25	3081
3	Fomalhaut W.	89 21 29	3476	90 42 20	3477	92 3 10	3477	93 24 0	3478
	α Pegasi W.	67 45 30	3255	69 10 34	3253	70 35 41	3249	72 0 52	3246
	α Arietis W.	24 13 30	3165	25 40 21	3157	27 7 22	3149	28 34 32	3142
	Pollux E.	51 34 49	3122	50 7 6	3124	48 39 25	3125	47 11 46	3128
	Regulus E.	88 21 56	3086	86 53 29	3087	85 25 3	3087	83 56 37	3086
4	Fomalhaut W.	100 7 51	3485	101 28 32	3488	102 49 10	3490	104 9 45	3493
	α Pegasi W.	79 7 47	3229	80 33 22	3225	81 59 1	3222	83 24 44	3219
	α Arietis W.	35 52 15	3114	37 20 7	3110	38 48 5	3105	40 16 9	3101
	Pollux E.	39 54 6	3137	38 26 41	3138	36 59 18	3141	35 31 58	3144
	Regulus E.	76 34 10	3080	75 5 36	3078	73 36 59	3075	72 8 19	3073
5	α Pegasi W.	90 34 23	3200	92 0 32	3197	93 26 45	3193	94 53 2	3189
	α Arietis W.	47 37 55	3076	49 6 34	3070	50 35 20	3065	52 4 12	3060
	Pollux E.	28 16 28	3170	26 49 43	3179	25 23 9	3191	23 56 49	3206
	Regulus E.	64 44 9	3057	63 15 7	3054	61 46 1	3050	60 16 50	3046
	JUPITER E.	105 57 33	3099	104 29 22	3094	103 1 5	3090	101 32 43	3086
6	α Pegasi W.	102 5 31	3173	103 32 12	3170	104 58 57	3167	106 25 46	3164
	α Arietis W.	59 30 8	3034	60 59 39	3027	62 29 18	3022	63 59 4	3016
	Regulus E.	52 49 39	3025	51 19 57	3020	49 50 9	3015	48 20 15	3010
	JUPITER E.	94 9 26	3060	92 40 28	3055	91 11 23	3050	89 42 12	3044
	Spica E.	106 52 26	3021	105 22 39	3016	103 52 46	3010	102 22 46	3005
7	α Arietis W.	71 29 43	2986	73 0 13	2979	74 30 52	2973	76 1 38	2966
	Aldebaran W.	39 40 45	3112	41 8 40	3098	42 36 52	3084	44 5 21	3071
	Regulus E.	40 49 15	2986	39 18 45	2981	37 48 8	2976	36 17 25	2972
	JUPITER E.	82 14 31	3016	80 44 38	3009	79 14 37	3004	77 44 29	2997
	Spica E.	94 51 1	2976	93 20 18	2970	91 49 28	2965	90 18 31	2958
8	α Arietis W.	83 37 33	2934	85 9 9	2927	86 40 54	2920	88 12 47	2913
	Aldebaran W.	51 31 32	3014	53 1 28	3003	54 31 37	2993	56 1 58	2983
	Regulus E.	28 42 27	2950	27 11 12	2947	25 39 53	2945	24 8 31	2943
	JUPITER E.	70 11 54	2967	68 41 0	2961	67 9 58	2955	65 38 49	2949
	Spica E.	82 41 43	2926	81 9 57	2920	79 38 3	2912	78 6 0	2905
9	α Arietis W.	95 54 26	2878	97 27 13	2871	99 0 9	2863	100 33 15	2856
	Aldebaran W.	63 36 48	2936	65 8 21	2927	66 40 6	2917	68 12 3	2909
	JUPITER E.	58 1 5	2917	56 29 8	2912	54 57 4	2905	53 24 52	2900
	Spica E.	70 23 34	2871	68 50 38	2863	67 17 32	2856	65 44 17	2849

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
10	Aldebaran W.	69 44 11	2899	71 16 31	2891	72 49 2	2882	74 21 44	2873
	Pollux W.	27 42 17	2948	29 13 35	2929	30 45 17	2912	32 17 21	2896
	JUPITER E.	51 52 33	2894	50 20 6	2888	48 47 32	2883	47 14 51	2876
	Spica E.	64 10 53	2842	62 37 19	2835	61 3 36	2826	59 29 42	2819
11	Aldebaran W.	82 8 8	2828	83 41 59	2819	85 16 2	2811	86 50 16	2801
	Pollux W.	40 2 22	2828	41 36 13	2816	43 10 20	2805	44 44 42	2792
	Spica E.	51 37 46	2780	50 2 52	2772	48 27 47	2764	46 52 32	2756
	Antares E.	97 19 10	2769	95 44 1	2760	94 8 41	2751	92 33 9	2743
	SATURN E.	97 54 45	2824	96 20 48	2815	94 46 39	2806	93 12 19	2797
12	Aldebaran W.	94 44 25	2756	96 19 51	2747	97 55 29	2738	99 31 19	2728
	Pollux W.	52 40 21	2736	54 16 13	2725	55 52 20	2713	57 28 42	2702
	Spica E.	38 53 33	2714	37 17 12	2707	35 40 41	2698	34 3 59	2690
	Antares E.	84 32 32	2696	82 55 47	2687	81 18 50	2678	79 41 40	2667
	SATURN E.	85 17 39	2750	83 42 6	2741	82 6 21	2731	80 30 22	2722
	SUN E.	128 44 47	3052	127 15 39	3042	125 46 18	3031	124 16 44	3021
13	Pollux W.	65 34 17	2646	67 12 10	2635	68 50 18	2623	70 28 42	2612
	Regulus W.	28 32 8	2644	30 10 3	2632	31 48 15	2618	33 26 46	2605
	Antares E.	71 32 24	2616	69 53 51	2605	68 15 3	2594	66 36 0	2583
	SATURN E.	72 27 12	2671	70 49 53	2660	69 12 20	2650	67 34 33	2640
	SUN E.	116 45 30	2965	115 14 33	2953	113 43 21	2941	112 11 54	2929
14	Pollux W.	78 44 40	2552	80 24 41	2540	82 4 58	2527	83 45 33	2516
	Regulus W.	41 43 43	2541	43 23 59	2528	45 4 33	2516	46 45 24	2503
	Antares E.	58 16 55	2527	56 36 19	2513	54 55 26	2502	53 14 16	2491
	SATURN E.	59 22 1	2585	57 42 46	2575	56 3 17	2564	54 23 33	2553
	SUN E.	104 30 49	2867	102 57 48	2855	101 24 31	2842	99 50 57	2829
15	Pollux W.	92 12 40	2455	93 54 57	2442	95 37 32	2430	97 20 24	2418
	Regulus W.	55 14 9	2439	56 56 48	2426	58 39 45	2414	60 23 0	2401
	Antares E.	44 44 14	2429	43 1 21	2417	41 18 11	2405	39 34 43	2392
	SATURN E.	46 1 11	2501	44 19 59	2492	42 38 34	2482	40 56 55	2472
	SUN E.	91 58 54	2763	90 23 37	2749	88 48 2	2735	87 12 9	2722
16	Pollux W.	105 59 5	2357	107 43 41	2345	109 28 35	2333	111 13 46	2322
	Regulus W.	69 3 52	2337	70 48 57	2325	72 34 20	2312	74 20 2	2300
	JUPITER W.	27 55 17	2460	29 37 27	2434	31 20 13	2411	33 3 32	2389
	Antares E.	30 52 55	2331	29 7 40	2318	27 22 7	2306	25 36 16	2294
	SATURN E.	32 25 41	2436	30 42 58	2432	29 0 9	2429	27 17 16	2411
	SUN E.	79 8 18	2655	77 30 38	2641	75 52 39	2629	74 14 23	2615
17	Regulus W.	83 12 56	2241	85 0 23	2230	86 48 6	2218	88 36 6	2208
	JUPITER W.	41 47 10	2301	43 33 8	2286	45 19 28	2272	47 6 9	2258
	Spica W.	29 13 28	2262	31 0 24	2247	32 47 41	2234	34 35 18	2222
	SUN E.	65 58 37	2552	64 18 36	2540	62 38 18	2528	60 57 44	2517
18	Regulus W.	97 39 57	2159	99 29 26	2150	101 19 9	2142	103 9 4	2134
	JUPITER W.	56 4 27	2197	57 52 59	2186	59 41 47	2177	61 30 49	2167
	Spica W.	43 37 48	2166	45 27 7	2157	47 16 40	2147	49 6 27	2139
	SUN E.	52 31 2	2464	50 48 58	2455	49 6 41	2445	47 24 11	2438



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
10	Aldebaran W.	75 54 38	2864	77 27 43	2855	79 1 0	2846	80 34 28	2837
	Pollux W.	33 49 45	2881	35 22 28	2867	36 55 29	2854	38 28 47	2841
	JUPITER E.	45 42 2	2872	44 9 7	2866	42 36 5	2862	41 2 57	2858
	Spica E.	57 55 39	2811	56 21 26	2804	54 47 3	2796	53 12 30	2788
11	Aldebaran W.	88 24 42	2792	89 59 20	2783	91 34 10	2775	93 9 11	2765
	Pollux W.	46 19 20	2781	47 54 13	2769	49 29 21	2758	51 4 44	2747
	Spica E.	45 17 6	2747	43 41 29	2739	42 5 41	2731	40 29 42	2723
	Antares E.	90 57 26	2734	89 21 31	2724	87 45 23	2716	86 9 4	2706
	SATURN E.	91 37 47	2788	90 3 3	2779	88 28 7	2769	86 52 59	2760
12	Aldebaran W.	101 7 22	2719	102 43 37	2709	104 20 5	2700	105 56 45	2691
	Pollux W.	59 5 19	2691	60 42 11	2680	62 19 18	2669	63 56 40	2657
	Spica E.	32 27 6	2683	30 50 3	2675	29 12 50	2667	27 35 26	2660
	Antares E.	78 4 16	2657	76 26 39	2647	74 48 48	2637	73 10 43	2626
	SATURN E.	78 54 11	2712	77 17 47	2701	75 41 9	2691	74 4 17	2682
	SUN E.	122 46 57	3010	121 16 57	2998	119 46 42	2987	118 16 13	2976
13	Pollux W.	72 7 21	2600	73 46 16	2588	75 25 28	2576	77 4 56	2564
	Regulus W.	35 5 34	2592	36 44 40	2580	38 24 3	2566	40 3 44	2553
	Antares E.	64 56 42	2572	63 17 9	2561	61 37 20	2549	59 57 15	2538
	SATURN E.	65 56 32	2629	64 18 16	2618	62 39 46	2607	61 1 1	2596
	SUN E.	110 40 12	2917	109 8 15	2905	107 36 2	2893	106 3 34	2880
14	Pollux W.	85 26 24	2504	87 7 32	2491	88 48 58	2480	90 30 40	2467
	Regulus W.	48 26 33	2490	50 8 0	2477	51 49 45	2465	53 31 48	2452
	Antares E.	51 32 50	2479	49 51 7	2467	48 9 7	2454	46 26 49	2442
	SATURN E.	52 43 34	2543	51 3 20	2533	49 22 52	2522	47 42 9	2511
	SUN E.	98 17 7	2816	96 43 0	2802	95 8 35	2789	93 33 53	2776
15	Pollux W.	99 3 33	2405	100 47 0	2394	102 30 44	2381	104 14 46	2369
	Regulus W.	62 6 34	2388	63 50 26	2375	65 34 36	2362	67 19 5	2350
	Antares E.	37 50 57	2380	36 6 53	2368	34 22 32	2355	32 37 53	2342
	SATURN E.	39 15 3	2464	37 32 59	2455	35 50 43	2448	34 8 17	2441
	SUN E.	85 35 59	2708	83 59 30	2695	82 22 44	2682	80 45 40	2669
16	Pollux W.	112 59 13	2311	114 44 56	2300	116 30 56	2289	118 17 12	2279
	Regulus W.	76 6 1	2288	77 52 18	2276	79 38 53	2264	81 25 46	2252
	JUPITER W.	34 47 22	2370	36 31 40	2351	38 16 25	2334	40 1 35	2317
	Antares E.	23 50 8	2282	22 3 42	2271	20 17 0	2259	18 30 0	2247
	SATURN E.	25 34 25	2433	23 51 38	2438	22 8 58	2448	20 26 32	2470
	SUN E.	72 35 49	2602	70 56 57	2590	69 17 48	2577	67 38 21	2564
17	Regulus W.	90 24 22	2198	92 12 53	2187	94 1 40	2178	95 50 41	2168
	JUPITER W.	48 53 11	2244	50 40 33	2232	52 28 13	2220	54 16 11	2208
	Spica W.	36 23 13	2210	38 11 26	2198	39 59 57	2187	41 48 44	2176
	SUN E.	59 16 54	2505	57 35 48	2494	55 54 27	2485	54 12 52	2474
18	Regulus W.	104 59 11	2127	106 49 29	2120	108 39 58	2112	110 30 36	2108
	JUPITER W.	63 20 6	2159	65 9 36	2151	66 59 18	2143	68 49 12	2136
	Spica W.	50 56 27	2130	52 46 40	2123	54 37 4	2116	56 27 39	2110
	SUN E.	45 41 30	2429	43 58 37	2422	42 15 33	2415	40 32 19	2408

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
19	JUPITER	W.	70 39 16	2130	72 29 30	2124	74 19 52	2118	76 10 23	2115
	Spica	W.	58 18 23	2104	60 9 16	2098	62 0 18	2094	63 51 27	2089
	Antares	W.	12 30 3	2099	14 21 4	2092	16 12 15	2087	18 3 34	2083
	SUN	E.	38 48 56	2402	37 5 24	2397	35 21 45	2392	33 37 59	2388
20	JUPITER	W.	85 24 16	2102	87 15 12	2102	89 6 8	2102	90 57 4	2103
	Spica	W.	73 8 29	2078	75 0 2	2078	76 51 35	2078	78 43 8	2079
	Antares	W.	27 21 25	2072	29 13 8	2072	31 4 51	2072	32 56 34	2073
	SATURN	W.	26 26 40	2197	28 15 12	2186	30 4 0	2178	31 53 1	2171
	SUN	E.	24 58 0	2378	23 13 53	2378	21 29 46	2378	19 45 40	2379
23	SUN	W.	16 10 25	2561	17 50 13	2576	19 29 41	2592	21 8 47	2607
	α Arietis	E.	76 28 41	2257	74 41 38	2271	72 54 56	2286	71 8 36	2302
	Aldebaran	E.	108 51 54	2306	107 6 3	2320	105 20 32	2333	103 35 20	2347
24	SUN	W.	29 18 43	2693	30 55 32	2712	32 31 56	2730	34 7 56	2749
	α Arietis	E.	62 22 45	2384	60 38 48	2402	58 55 16	2419	57 12 9	2438
	Aldebaran	E.	94 54 40	2424	93 11 40	2441	91 29 3	2458	89 46 50	2475
25	SUN	W.	42 1 43	2844	43 35 14	2864	45 8 19	2883	46 40 59	2902
	α Arietis	E.	48 43 6	2532	47 2 37	2551	45 22 35	2571	43 43 0	2591
	Aldebaran	E.	81 21 58	2565	79 42 15	2584	78 2 58	2603	76 24 7	2621
26	SUN	W.	54 18 12	2999	55 48 26	3018	57 18 16	3037	58 47 43	3055
	α Arietis	E.	35 32 1	2694	33 55 13	2716	32 18 54	2738	30 43 4	2761
	Aldebaran	E.	68 16 16	2717	66 39 59	2736	65 4 7	2755	63 28 40	2775
27	SUN	W.	66 9 24	3144	67 36 40	3162	69 3 35	3178	70 30 10	3194
	Aldebaran	E.	55 37 44	2870	54 4 47	2890	52 32 15	2909	51 0 7	2928
	Pollux	E.	97 26 27	2808	95 52 9	2823	94 18 11	2838	92 44 33	2853
28	SUN	W.	77 38 26	3270	79 3 13	3283	80 27 44	3297	81 51 59	3310
	α Pegasi	W.	36 8 4	3348	37 31 20	3330	38 54 57	3315	40 18 51	3303
	Aldebaran	E.	43 25 37	3027	41 55 58	3047	40 26 44	3069	38 57 56	3091
	Pollux	E.	85 1 0	2923	83 29 10	2935	81 57 36	2948	80 26 18	2960
29	SUN	W.	88 49 41	3367	90 12 35	3378	91 35 17	3387	92 57 48	3396
	α Pegasi	W.	47 21 9	3268	48 45 58	3265	50 10 51	3262	51 35 47	3259
	Aldebaran	E.	31 41 3	3218	30 15 15	3248	28 50 3	3282	27 25 31	3320
	Pollux	E.	72 53 26	3014	71 23 31	3024	69 53 48	3034	68 24 17	3042
	Regulus	E.	109 48 22	2994	108 18 2	3003	106 47 53	3011	105 17 54	3020
30	SUN	W.	99 48 3	3433	101 9 42	3438	102 31 15	3444	103 52 42	3449
	α Pegasi	W.	58 40 59	3253	60 6 6	3253	61 31 13	3252	62 56 21	3251
	Pollux	E.	60 59 12	3080	59 30 38	3087	58 2 12	3092	56 33 53	3098
	Regulus	E.	97 50 21	3053	96 21 14	3059	94 52 14	3063	93 23 19	3068
31	SUN	W.	110 38 46	3465	111 59 49	3467	113 20 50	3469	114 41 49	3469
	α Pegasi	W.	70 2 16	3246	71 27 31	3245	72 52 47	3243	74 18 5	3241
	α Arietis	W.	26 33 15	3148	28 0 27	3143	29 27 45	3138	30 55 9	3133
	Pollux	E.	49 13 52	3121	47 46 8	3124	46 18 28	3129	44 50 53	3131
	Regulus	E.	85 59 55	3082	84 31 24	3084	83 2 55	3085	81 34 27	3086

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
19	JUPITER W.	78 1 0	2111	79 51 43	2107	81 42 31	2105	83 33 22	2103
	Spica W.	65 42 43	2086	67 34 4	2083	69 25 29	2081	71 16 58	2079
	Antares W.	19 54 59	2079	21 46 30	2077	23 38 5	2074	25 29 44	2073
	SUN E.	31 54 7	2384	30 10 10	2382	28 26 10	2380	26 42 6	2378
20	JUPITER W.	92 47 59	2105	94 38 51	2107	96 29 39	2111	98 20 22	2114
	Spica W.	80 34 40	2081	82 26 9	2083	84 17 34	2086	86 8 55	2090
	Antares W.	34 48 15	2074	36 39 54	2077	38 31 29	2080	40 22 59	2085
	SATURN W.	33 42 12	2166	35 31 31	2163	37 20 55	2161	39 10 22	2159
	SUN E.	18 1 35	2381	16 17 33	2384	14 33 36	2389	12 49 45	2394
23	SUN W.	22 47 32	2624	24 25 54	2640	26 3 54	2658	27 41 30	2675
	α Arietis E.	69 22 39	2317	67 37 5	2333	65 51 54	2350	64 7 7	2367
	Aldebaran E.	101 50 29	2362	100 5 59	2376	98 21 50	2392	96 38 4	2408
24	SUN W.	35 43 31	2768	37 18 41	2786	38 53 27	2805	40 27 48	2825
	α Arietis E.	55 29 28	2456	53 47 13	2475	52 5 24	2494	50 24 2	2512
	Aldebaran E.	88 5 2	2493	86 23 39	2510	84 42 40	2528	83 2 6	2547
25	SUN W.	48 13 15	2922	49 45 6	2942	51 16 32	2961	52 47 34	2980
	α Arietis E.	42 3 53	2611	40 25 13	2632	38 47 1	2652	37 9 17	2673
	Aldebaran E.	74 45 41	2640	73 7 41	2660	71 30 7	2679	69 52 59	2698
26	SUN W.	60 16 48	3073	61 45 30	3091	63 13 50	3110	64 41 48	3128
	α Arietis E.	29 7 45	2784	27 32 56	2808	25 58 39	2834	24 24 55	2860
	Aldebaran E.	61 53 39	2794	60 19 3	2813	58 44 52	2832	57 11 6	2851
27	SUN W.	71 56 26	3210	73 22 23	3225	74 48 2	3241	76 13 23	3256
	Aldebaran E.	49 28 24	2947	47 57 5	2967	46 26 11	2986	44 55 41	3007
	Pollux E.	91 11 14	2867	89 38 13	2882	88 5 31	2896	86 33 7	2909
28	SUN W.	83 15 59	3322	84 39 45	3334	86 3 17	3346	87 26 35	3357
	α Pegasi W.	41 42 59	3293	43 7 19	3285	44 31 48	3278	45 56 25	3272
	Aldebaran E.	37 29 36	3114	36 1 43	3138	34 34 19	3163	33 7 25	3189
	Pollux E.	78 55 15	2972	77 24 27	2983	75 53 53	2994	74 23 33	3005
29	SUN W.	94 20 9	3404	95 42 21	3413	97 4 23	3420	98 26 17	3427
	α Pegasi W.	53 0 46	3258	54 25 47	3256	55 50 50	3255	57 15 54	3254
	Aldebaran E.	26 1 43	3163	24 38 44	3412	23 16 41	3468	21 55 41	3535
	Pollux E.	66 54 56	3051	65 25 46	3058	63 56 45	3066	62 27 54	3073
	Regulus E.	103 48 6	3027	102 18 27	3034	100 48 57	3041	99 19 35	3047
30	SUN W.	105 14 3	3453	106 35 20	3457	107 56 32	3460	109 17 41	3463
	α Pegasi W.	64 21 30	3250	65 46 40	3249	67 11 51	3248	68 37 3	3247
	Pollux E.	55 5 41	3103	53 37 35	3108	52 9 35	3113	50 41 41	3117
	Regulus E.	91 54 30	3071	90 25 45	3075	88 57 5	3078	87 28 28	3081
31	SUN W.	116 2 48	3470	117 23 46	3469	118 44 45	3469	120 5 44	3467
	α Pegasi W.	75 43 26	3239	77 8 49	3237	78 34 14	3235	79 59 42	3232
	α Arietis W.	32 22 38	3129	33 50 12	3125	35 17 51	3121	36 45 35	3118
	Pollux E.	43 23 21	3134	41 55 53	3138	40 28 29	3141	39 1 9	3143
	Regulus E.	80 6 0	3087	78 37 34	3086	77 9 7	3085	75 40 39	3084

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ' "	"	' "	s	m s	s
Tues.	1	21 0 44.60	10.174	S. 17 0 9.0	+42.95	16 15.99	68.23	13 51.12	0.318
Wed.	2	21 4 48.37	10.140	16 42 49.4	43.67	16 15.84	68.12	13 58.31	0.283
Thur.	3	21 8 51.30	10.105	16 25 12.4	44.39	16 15.69	68.00	14 4.68	0.248
Frid.	4	21 12 53.40	10.070	16 7 18.4	+45.10	16 15.54	67.88	14 10.20	0.214
Sat.	5	21 16 54.68	10.036	15 49 7.9	45.78	16 15.38	67.77	14 14.92	0.180
SUN.	6	21 20 55.14	10.002	15 30 41.1	46.45	16 15.21	67.65	14 18.82	0.146
Mon.	7	21 24 54.80	9.969	15 11 58.5	+47.10	16 15.04	67.54	14 21.91	0.112
Tues.	8	21 28 53.66	9.936	14 53 0.5	47.73	16 14.86	67.43	14 24.21	0.079
Wed.	9	21 32 51.74	9.904	14 33 47.4	48.34	16 14.67	67.32	14 25.73	0.047
Thur.	10	21 36 49.05	9.872	14 14 19.7	+48.95	16 14.48	67.21	14 26.47	0.015
Frid.	11	21 40 45.59	9.840	13 54 37.8	49.53	16 14.29	67.10	14 26.46	0.016
Sat.	12	21 44 41.38	9.809	13 34 42.0	50.10	16 14.10	66.99	14 25.70	0.047
SUN.	13	21 48 36.43	9.778	13 14 32.8	+50.65	16 13.90	66.88	14 24.20	0.078
Mon.	14	21 52 30.75	9.748	12 54 10.5	51.19	16 13.70	66.77	14 21.97	0.108
Tues.	15	21 56 24.35	9.718	12 33 35.7	51.70	16 13.49	66.67	14 19.02	0.137
Wed.	16	22 0 17.25	9.689	12 12 48.7	+52.20	16 13.28	66.57	14 15.38	0.166
Thur.	17	22 4 9.45	9.660	11 51 49.9	52.68	16 13.06	66.47	14 11.03	0.195
Frid.	18	22 8 0.96	9.632	11 30 39.8	53.15	16 12.85	66.37	14 6.00	0.223
Sat.	19	22 11 51.80	9.604	11 9 18.8	+53.59	16 12.63	66.27	14 0.31	0.251
SUN.	20	22 15 41.97	9.577	10 47 47.3	54.02	16 12.41	66.17	13 53.93	0.279
Mon.	21	22 19 31.49	9.550	10 26 5.9	54.43	16 12.19	66.08	13 46.93	0.306
Tues.	22	22 23 20.36	9.523	10 4 14.9	+54.82	16 11.97	65.99	13 39.26	0.332
Wed.	23	22 27 8.61	9.497	9 42 14.8	55.19	16 11.74	65.90	13 30.98	0.358
Thur.	24	22 30 56.24	9.472	9 20 5.9	55.54	16 11.52	65.81	13 22.08	0.384
Frid.	25	22 34 43.26	9.447	8 57 48.8	+55.88	16 11.29	65.73	13 12.57	0.408
Sat.	26	22 38 29.70	9.423	8 35 23.8	56.20	16 11.06	65.65	13 2.48	0.432
SUN.	27	22 42 15.56	9.399	8 12 51.4	56.50	16 10.83	65.57	12 51.82	0.456
Mon.	28	22 46 0.86	9.376	7 50 11.9	56.78	16 10.60	65.49	12 40.60	0.479
Tues.	29	22 49 45.62	9.354	S. 7 27 25.8	+57.05	16 10.36	65.42	12 28.85	0.501

NOTE.—The mean time of semidiameter passing may be found by subtracting 0°.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
Tues.	1	21 0 42.25	10.174	S. 17 0 19.0	+42.94	13 51.05	0.318	20 46 51.20
Wed.	2	21 4 46.00	10.139	16 42 59.7	43.67	13 58.24	0.283	20 50 47.76
Thur.	3	21 8 48.93	10.104	16 25 22.9	44.39	14 4.62	0.248	20 54 44.31
Frid.	4	21 12 51.02	10.070	16 7 29.2	+45.09	14 10.15	0.214	20 58 40.87
Sat.	5	21 16 52.30	10.036	15 49 18.8	45.77	14 14.88	0.180	21 2 37.42
SUN.	6	21 20 52.76	10.002	15 30 52.2	46.44	14 18.78	0.146	21 6 33.98
Mon.	7	21 24 52.41	9.969	15 12 9.8	+47.09	14 21.88	0.112	21 10 30.53
Tues.	8	21 28 51.28	9.936	14 53 12.0	47.72	14 24.19	0.079	21 14 27.09
Wed.	9	21 32 49.36	9.904	14 33 59.1	48.34	14 25.72	0.047	21 18 23.64
Thur.	10	21 36 46.67	9.872	14 14 31.6	+48.94	14 26.47	0.015	21 22 20.20
Frid.	11	21 40 43.22	9.841	13 54 49.8	49.53	14 26.46	0.016	21 26 16.76
Sat.	12	21 44 39.02	9.810	13 34 54.1	50.10	14 25.71	0.047	21 30 13.31
SUN.	13	21 48 34.08	9.779	13 14 45.0	+50.65	14 24.22	0.078	21 34 9.86
Mon.	14	21 52 28.42	9.749	12 54 22.9	51.18	14 22.00	0.108	21 38 6.42
Tues.	15	21 56 22.03	9.719	12 33 48.1	51.70	14 19.05	0.137	21 42 2.98
Wed.	16	22 0 14.95	9.690	12 13 1.2	+52.20	14 15.42	0.166	21 45 59.53
Thur.	17	22 4 7.16	9.661	11 52 2.4	52.68	14 11.08	0.195	21 49 56.08
Frid.	18	22 7 58.70	9.633	11 30 52.3	53.14	14 6.06	0.223	21 53 52.64
Sat.	19	22 11 49.56	9.605	11 9 31.4	+53.59	14 0.37	0.251	21 57 49.19
SUN.	20	22 15 39.75	9.578	10 47 59.9	54.02	13 54.00	0.279	22 1 45.75
Mon.	21	22 19 29.30	9.551	10 26 18.5	54.43	13 47.00	0.306	22 5 42.30
Tues.	22	22 23 18.20	9.525	10 4 27.4	+54.82	13 39.34	0.332	22 9 38.86
Wed.	23	22 27 6.47	9.499	9 42 27.3	55.19	13 31.06	0.358	22 13 35.41
Thur.	24	22 30 54.13	9.473	9 20 18.4	55.54	13 22.17	0.384	22 17 31.96
Frid.	25	22 34 41.18	9.448	8 58 1.1	+55.88	13 12.66	0.408	22 21 28.52
Sat.	26	22 38 27.65	9.424	8 35 36.1	56.20	13 2.58	0.432	22 25 25.07
SUN.	27	22 42 13.54	9.401	8 13 3.6	56.50	12 51.92	0.456	22 29 21.62
Mon.	28	22 45 58.88	9.378	7 50 24.0	56.79	12 40.70	0.479	22 33 18.18
Tues.	29	22 49 43.68	9.356	S. 7 27 37.7	+57.06	12 28.95	0.501	22 37 14.73

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing.

Diff. for 1 Hour,  
+0°.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	32	312 42 50.3	42 29.3	152.11	+ 0.46	9.9937293	+26.7	h m s 3 12 37.16
2	33	313 43 40.5	43 19.3	152.06	0.35	9.9937944	27.6	3 8 41.25
3	34	314 44 29.4	44 8.1	152.01	0.23	9.9938618	28.6	3 4 45.34
4	35	315 45 16.8	44 55.3	151.95	+ 0.10	9.9939314	+29.6	3 0 49.43
5	36	316 46 3.1	45 41.5	151.90	- 0.03	9.9940035	30.6	2 56 53.52
6	37	317 46 48.0	46 26.2	151.84	0.17	9.9940779	31.6	2 52 57.61
7	38	318 47 31.7	47 9.8	151.79	- 0.29	9.9941548	+32.6	2 49 1.70
8	39	319 48 14.1	47 52.0	151.74	0.38	9.9942340	33.5	2 45 5.79
9	40	320 48 55.4	48 33.2	151.69	0.46	9.9943155	34.4	2 41 9.88
10	41	321 49 35.4	49 13.1	151.64	- 0.50	9.9943993	+35.3	2 37 13.97
11	42	322 50 14.4	49 52.0	151.59	0.52	9.9944850	36.1	2 33 18.06
12	43	323 50 52.1	50 29.5	151.54	0.50	9.9945727	36.8	2 29 22.15
13	44	324 51 28.7	51 6.0	151.49	- 0.45	9.9946621	+37.5	2 25 26.24
14	45	325 52 4.1	51 31.3	151.44	0.39	9.9947532	38.2	2 21 30.34
15	46	326 52 38.4	52 15.5	151.39	0.30	9.9948457	38.8	2 17 34.43
16	47	327 53 11.3	52 48.3	151.34	- 0.19	9.9949396	+39.3	2 13 38.52
17	48	328 53 43.1	53 19.9	151.29	- 0.06	9.9950347	39.8	2 9 42.61
18	49	329 54 13.4	53 50.1	151.23	+ 0.07	9.9951308	40.2	2 5 46.70
19	50	330 54 42.4	54 19.0	151.17	+ 0.21	9.9952278	+40.4	2 1 50.79
20	51	331 55 9.8	54 46.3	151.11	0.33	9.9953257	40.8	1 57 54.88
21	52	332 55 35.6	55 12.0	151.04	0.44	9.9954244	41.2	1 53 58.98
22	53	333 55 59.7	55 35.9	150.97	+ 0.52	9.9955238	+41.5	1 50 3.07
23	54	334 56 22.0	55 58.1	150.89	0.58	9.9956239	41.8	1 46 7.16
24	55	335 56 42.5	56 18.5	150.81	0.61	9.9957247	42.2	1 42 11.25
25	56	336 57 1.1	56 37.0	150.73	+ 0.61	9.9958265	+42.6	1 38 15.34
26	57	337 57 17.7	56 53.5	150.65	0.59	9.9959290	43.0	1 34 19.43
27	58	338 57 32.2	57 7.8	150.56	0.53	9.9960325	43.4	1 30 23.53
28	59	339 57 44.8	57 20.3	150.48	0.44	9.9961370	43.8	1 26 27.62
29	60	340 57 55.2	57 30.6	150.39	+ 0.33	9.9962425	+44.2	1 22 31.71
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0.0.								Diff. for 1 Hour, —9 <sup>s</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	THE MOON'S								
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	14 46.8	14 47.3	54 7.8	+0.05	54 9.5	+0.23	h m 8 19.7	m 2.11	d 10.2
2	14 48.3	14 49.9	54 13.4	0.41	54 19.3	0.57	9 10.3	2.11	11.2
3	14 52.0	14 54.5	54 27.0	0.70	54 36.2	0.83	10 0.5	2.07	12.2
4	14 57.4	15 0.7	54 46.9	+0.94	54 58.7	+1.03	10 49.6	2.01	13.2
5	15 4.1	15 7.8	55 11.5	1.10	55 25.1	1.15	11 37.0	1.94	14.2
6	15 11.7	15 15.6	55 39.2	1.19	55 53.7	1.22	12 22.9	1.89	15.2
7	15 19.6	15 23.7	56 8.4	+1.23	56 23.2	+1.23	13 7.7	1.85	16.2
8	15 27.7	15 31.7	56 37.9	1.23	56 52.6	1.21	13 52.2	1.86	17.2
9	15 35.6	15 39.5	57 7.0	1.19	57 21.2	1.17	14 37.2	1.91	18.2
10	15 43.2	15 46.9	57 35.1	+1.15	57 48.7	+1.12	15 24.0	2.00	19.2
11	15 50.6	15 54.1	58 2.0	1.09	58 14.9	1.07	16 13.6	2.14	20.2
12	15 57.5	16 0.8	58 27.5	1.03	58 39.5	0.98	17 6.8	2.30	21.2
13	16 3.9	16 6.9	58 51.1	+0.94	59 2.0	+0.87	18 4.1	2.47	22.2
14	16 9.6	16 12.1	59 12.0	0.80	59 21.1	0.70	19 4.7	2.58	23.2
15	16 14.2	16 15.9	59 28.9	0.58	59 35.1	0.45	20 7.1	2.60	24.2
16	16 17.1	16 17.8	59 39.6	+0.29	59 42.1	+0.12	21 8.7	2.52	25.2
17	16 17.9	16 17.3	59 42.4	-0.08	59 40.2	-0.29	22 7.6	2.38	26.2
18	16 16.0	16 13.9	59 35.4	0.51	59 27.9	0.74	23 2.7	2.21	27.2
19	16 11.2	16 7.7	59 17.7	-0.96	59 4.9	-1.17	23 54.0	2.07	28.2
20	16 3.5	15 58.8	58 49.7	1.36	58 32.3	1.53	0		29.2
21	15 53.6	15 47.9	58 13.1	1.66	57 52.4	1.77	0 42.4	1.96	0.7
22	15 42.0	15 36.0	57 30.7	-1.83	57 8.4	-1.86	1 28.7	1.90	1.7
23	15 29.9	15 23.9	56 46.1	1.85	56 24.0	1.81	2 14.1	1.88	2.7
24	15 18.1	15 12.6	56 2.7	1.73	55 42.5	1.63	2 59.4	1.90	3.7
25	15 7.5	15 2.9	55 23.7	-1.49	55 6.8	-1.33	3 45.6	1.95	4.7
26	14 58.8	14 55.4	54 51.9	1.15	54 39.3	0.95	4 32.9	2.00	5.7
27	14 52.6	14 50.5	54 29.0	0.75	54 21.3	0.53	5 21.7	2.06	6.7
28	14 49.1	14 48.4	54 16.2	-0.31	54 13.8	-0.09	6 11.6	2.09	7.7
29	14 48.5	14 49.2	54 14.0	+0.12	54 16.7	+0.33	7 2.0	2.10	8.7

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 1.					THURSDAY 3.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	4 49 39.68	2.1900	N.26 4 13.5	1.563	0	6 35 9.06	2.1833	N.24 55 4.9	4.426
1	4 51 51.12	2.1912	26 5 43.6	1.440	1	6 37 20.02	2.1818	24 50 35.7	4.547
2	4 54 2.63	2.1923	26 7 6.3	1.316	2	6 39 30.88	2.1803	24 45 59.2	4.668
3	4 56 14.20	2.1934	26 8 21.5	1.191	3	6 41 41.65	2.1787	24 41 15.5	4.788
4	4 58 25.84	2.1945	26 9 29.2	1.067	4	6 43 52.33	2.1771	24 36 24.6	4.909
5	5 0 37.54	2.1955	26 10 29.5	0.942	5	6 46 2.90	2.1753	24 31 26.4	5.029
6	5 2 49.30	2.1964	26 11 22.3	0.817	6	6 48 13.37	2.1737	24 26 21.1	5.148
7	5 5 1.11	2.1972	26 12 7.6	0.693	7	6 50 23.74	2.1719	24 21 8.7	5.267
8	5 7 12.97	2.1981	26 12 45.5	0.568	8	6 52 34.00	2.1701	24 15 49.1	5.386
9	5 9 24.88	2.1989	26 13 15.8	0.442	9	6 54 44.15	2.1683	24 10 22.4	5.504
10	5 11 36.84	2.1996	26 13 38.6	0.317	10	6 56 54.19	2.1664	24 4 48.6	5.622
11	5 13 48.83	2.2002	26 13 53.8	0.191	11	6 59 4.12	2.1644	23 59 7.8	5.739
12	5 16 0.86	2.2008	26 14 1.5	+0.066	12	7 1 13.92	2.1624	23 53 19.9	5.857
13	5 18 12.93	2.2013	26 14 1.7	-0.059	13	7 3 23.61	2.1604	23 47 25.0	5.973
14	5 20 25.02	2.2018	26 13 54.4	0.185	14	7 5 33.17	2.1583	23 41 23.2	6.088
15	5 22 37.14	2.2023	26 13 39.5	0.312	15	7 7 42.61	2.1563	23 35 14.4	6.204
16	5 24 49.29	2.2026	26 13 17.0	0.437	16	7 9 51.93	2.1542	23 28 58.7	6.319
17	5 27 1.45	2.2028	26 12 47.0	0.563	17	7 12 1.12	2.1521	23 22 36.1	6.433
18	5 29 13.63	2.2032	26 12 9.4	0.689	18	7 14 10.18	2.1499	23 16 6.7	6.547
19	5 31 25.83	2.2033	26 11 24.3	0.815	19	7 16 19.11	2.1477	23 9 30.4	6.661
20	5 33 38.03	2.2033	26 10 31.6	0.941	20	7 18 27.90	2.1454	23 2 47.4	6.773
21	5 35 50.23	2.2034	26 9 31.4	1.067	21	7 20 36.56	2.1432	22 55 57.6	6.886
22	5 38 2.44	2.2035	26 8 23.6	1.193	22	7 22 45.08	2.1408	22 49 1.1	6.998
23	5 40 14.65	2.2034	N.26 7 8.2	1.319	23	7 24 53.46	2.1386	N.22 41 57.9	7.109
WEDNESDAY 2.					FRIDAY 4.				
0	5 42 26.85	2.2033	N.26 5 45.3	1.445	0	7 27 1.71	2.1363	N.22 34 48.0	7.220
1	5 44 39.04	2.2031	26 4 14.8	1.571	1	7 29 9.81	2.1338	22 27 31.5	7.330
2	5 46 51.22	2.2029	26 2 36.8	1.697	2	7 31 17.77	2.1315	22 20 8.4	7.439
3	5 49 3.39	2.2027	26 0 51.2	1.822	3	7 33 25.59	2.1291	22 12 38.8	7.548
4	5 51 15.54	2.2023	25 58 58.1	1.948	4	7 35 33.26	2.1267	22 5 2.6	7.657
5	5 53 27.66	2.2018	25 56 57.4	2.074	5	7 37 40.79	2.1242	21 57 20.0	7.764
6	5 55 39.75	2.2013	25 54 49.2	2.199	6	7 39 48.17	2.1217	21 49 30.9	7.872
7	5 57 51.82	2.2008	25 52 33.5	2.324	7	7 41 55.40	2.1192	21 41 35.4	7.978
8	6 0 3.85	2.2002	25 50 10.3	2.450	8	7 44 2.47	2.1167	21 33 33.6	8.083
9	6 2 15.85	2.1997	25 47 39.5	2.575	9	7 46 9.40	2.1142	21 25 25.4	8.189
10	6 4 27.81	2.1989	25 45 1.3	2.700	10	7 48 16.18	2.1117	21 17 10.9	8.293
11	6 6 39.72	2.1981	25 42 15.5	2.825	11	7 50 22.80	2.1091	21 8 50.2	8.397
12	6 8 51.58	2.1973	25 39 22.3	2.949	12	7 52 29.27	2.1066	21 0 23.3	8.500
13	6 11 3.39	2.1964	25 36 21.6	3.074	13	7 54 35.59	2.1040	20 51 50.2	8.602
14	6 13 15.15	2.1955	25 33 13.4	3.198	14	7 56 41.75	2.1014	20 43 11.0	8.704
15	6 15 26.85	2.1945	25 29 57.8	3.322	15	7 58 47.76	2.0988	20 34 25.7	8.805
16	6 17 38.49	2.1935	25 26 34.8	3.446	16	8 0 53.61	2.0963	20 25 34.4	8.906
17	6 19 50.07	2.1924	25 23 4.3	3.569	17	8 2 59.31	2.0937	20 16 37.0	9.006
18	6 22 1.58	2.1913	25 19 26.5	3.692	18	8 5 4.85	2.0911	20 7 33.7	9.104
19	6 24 13.02	2.1901	25 15 41.3	3.815	19	8 7 10.24	2.0885	19 58 24.5	9.203
20	6 26 24.39	2.1888	25 11 48.7	3.938	20	8 9 15.47	2.0858	19 49 9.4	9.301
21	6 28 35.68	2.1875	25 7 48.7	4.061	21	8 11 20.54	2.0833	19 39 48.4	9.398
22	6 30 46.89	2.1862	25 3 41.4	4.183	22	8 13 25.46	2.0807	19 30 21.7	9.493
23	6 32 58.02	2.1848	24 59 26.8	4.304	23	8 15 30.22	2.0780	19 20 49.2	9.589
24	6 35 9.06	2.1833	N.24 55 4.9	4.426	24	8 17 34.82	2.0754	N.19 11 11.0	9.683



GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 5.					MONDAY 7.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	8 17 34.82	2.0754	N. 19 11 11.0	9.683	1	9 54 31.20	1.9746	N. 9 53 0.2	13.238
2	8 19 39.27	2.0728	19 1 27.2	9.778	2	9 56 29.64	1.9734	9 39 44.4	13.289
3	8 21 43.56	2.0702	18 51 37.7	9.871	3	9 58 28.01	1.9722	9 26 25.5	13.341
4	8 23 47.70	2.0677	18 41 42.7	9.962	4	10 0 26.30	1.9710	9 13 3.5	13.391
5	8 25 51.68	2.0651	18 31 42.2	10.054	5	10 2 24.53	1.9700	8 59 38.6	13.439
6	8 27 55.51	2.0626	18 21 36.2	10.145	6	10 4 22.70	1.9690	8 46 10.8	13.488
7	8 29 59.19	2.0600	18 11 24.8	10.234	7	10 6 20.81	1.9680	8 32 40.1	13.535
8	8 32 2.71	2.0574	18 1 8.1	10.323	8	10 8 18.86	1.9671	8 19 6.6	13.581
9	8 34 6.08	2.0548	17 50 46.0	10.412	9	10 10 16.86	1.9663	8 5 30.4	13.625
10	8 36 9.29	2.0523	17 40 18.6	10.500	10	10 12 14.81	1.9654	7 51 51.6	13.669
11	8 38 12.36	2.0499	17 29 46.0	10.587	11	10 14 12.71	1.9646	7 38 10.1	13.712
12	8 40 15.28	2.0473	17 19 8.2	10.672	12	10 16 10.56	1.9639	7 24 26.1	13.754
13	8 42 18.04	2.0448	17 8 25.3	10.757	13	10 18 8.38	1.9633	7 10 39.6	13.796
14	8 44 20.66	2.0424	16 57 37.3	10.842	14	10 20 6.16	1.9627	6 56 50.6	13.836
15	8 46 23.13	2.0400	16 46 44.3	10.925	15	10 22 3.90	1.9621	6 42 59.3	13.874
16	8 48 25.46	2.0376	16 35 46.3	11.008	16	10 24 1.61	1.9615	6 29 5.7	13.913
17	8 50 27.64	2.0352	16 24 43.3	11.090	17	10 25 59.29	1.9612	6 15 9.8	13.950
18	8 52 29.68	2.0328	16 13 35.5	11.171	18	10 27 56.95	1.9608	6 1 11.7	13.987
19	8 54 31.58	2.0305	16 2 22.8	11.251	19	10 29 54.59	1.9605	5 47 11.4	14.022
20	8 56 33.34	2.0282	15 51 5.4	11.330	20	10 31 52.21	1.9603	5 33 9.1	14.055
21	8 58 34.96	2.0258	15 39 43.2	11.408	21	10 33 49.82	1.9601	5 19 4.8	14.088
22	9 0 36.44	2.0235	15 28 16.4	11.485	22	10 35 47.42	1.9599	5 4 58.5	14.121
23	9 2 37.78	2.0213	15 16 45.0	11.562	23	10 37 45.01	1.9598	4 50 50.3	14.152
	9 4 38.99	2.0190	N. 15 5 9.0	11.637		10 39 42.60	1.9598	N. 4 36 40.3	14.181
SUNDAY 6.					TUESDAY 8.				
0	9 6 40.06	2.0168	N. 14 53 28.5	11.712	0	10 41 40.19	1.9598	N. 4 22 28.6	14.209
1	9 8 41.00	2.0147	14 41 43.5	11.787	1	10 43 37.78	1.9599	4 8 15.2	14.237
2	9 10 41.82	2.0126	14 29 54.1	11.859	2	10 45 35.38	1.9601	3 54 0.1	14.265
3	9 12 42.51	2.0104	14 18 0.4	11.932	3	10 47 32.99	1.9603	3 39 43.4	14.291
4	9 14 43.07	2.0083	14 6 2.3	12.003	4	10 49 30.62	1.9607	3 25 25.2	14.315
5	9 16 43.50	2.0063	13 54 0.0	12.073	5	10 51 28.27	1.9610	3 11 5.6	14.339
6	9 18 43.82	2.0043	13 41 53.5	12.143	6	10 53 25.94	1.9613	2 56 44.5	14.362
7	9 20 44.02	2.0023	13 29 42.8	12.213	7	10 55 23.63	1.9618	2 42 22.1	14.383
8	9 22 44.10	2.0003	13 17 28.0	12.280	8	10 57 21.36	1.9624	2 27 58.5	14.404
9	9 24 44.06	1.9984	13 5 9.2	12.347	9	10 59 19.12	1.9630	2 13 33.6	14.424
10	9 26 43.91	1.9965	12 52 46.4	12.413	10	11 1 16.92	1.9637	1 59 7.6	14.442
11	9 28 43.64	1.9947	12 40 19.7	12.477	11	11 3 14.76	1.9643	1 44 40.6	14.459
12	9 30 43.27	1.9929	12 27 49.1	12.542	12	11 5 12.64	1.9652	1 30 12.5	14.476
13	9 32 42.79	1.9912	12 15 14.7	12.605	13	11 7 10.58	1.9661	1 15 43.5	14.491
14	9 34 42.21	1.9895	12 2 36.5	12.667	14	11 9 8.57	1.9670	1 1 13.6	14.505
15	9 36 41.53	1.9878	11 49 54.6	12.728	15	11 11 6.62	1.9680	0 46 42.9	14.518
16	9 38 40.74	1.9861	11 37 9.1	12.788	16	11 13 4.73	1.9691	0 32 11.4	14.530
17	9 40 39.86	1.9846	11 24 20.0	12.848	17	11 15 2.91	1.9702	0 17 39.3	14.541
18	9 42 38.89	1.9830	11 11 27.3	12.907	18	11 17 1.15	1.9713	N. 0 3 6.5	14.552
19	9 44 37.82	1.9815	10 58 31.2	12.964	19	11 18 59.47	1.9727	S. 0 11 26.9	14.560
20	9 46 36.67	1.9801	10 45 31.6	13.021	20	11 20 57.87	1.9740	0 26 0.7	14.567
21	9 48 35.43	1.9786	10 32 28.7	13.077	21	11 22 56.35	1.9754	0 40 35.0	14.574
22	9 50 34.10	1.9772	10 19 22.4	13.132	22	11 24 54.92	1.9769	0 55 9.6	14.579
23	9 52 32.69	1.9758	10 6 12.9	13.185	23	11 26 53.58	1.9785	1 9 44.5	14.583
24	9 54 31.20	1.9746	N. 9 53 0.2	13.238	24	11 28 52.34	1.9801	S. 1 24 19.6	14.587

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 9.					FRIDAY 11.				
0	h m s	° ' "	° ' "	° ' "	0	h m s	° ' "	° ' "	° ' "
1	11 28 52.34	1.9801	S. 1 24 19.6	14.587	1	13 7 6.27	2.1397	S. 12 45 43.9	13.327
2	11 30 51.19	1.9818	1 38 54.9	14.588	2	13 9 14.80	2.1447	12 59 1.8	13.268
3	11 32 50.15	1.9835	1 53 30.2	14.589	3	13 11 23.63	2.1498	13 12 16.1	13.209
4	11 34 49.21	1.9853	2 8 5.6	14.590	4	13 13 32.77	2.1548	13 25 26.9	13.148
5	11 36 48.38	1.9872	2 22 41.0	14.588	5	13 15 42.21	2.1599	13 38 33.9	13.086
6	11 38 47.67	1.9892	2 37 16.2	14.585	6	13 17 51.96	2.1652	13 51 37.2	13.023
7	11 40 47.08	1.9912	2 51 51.2	14.582	7	13 20 2.03	2.1705	14 4 36.6	12.958
8	11 42 46.61	1.9933	3 6 26.0	14.577	8	13 22 12.42	2.1758	14 17 32.1	12.892
9	11 44 46.27	1.9954	3 21 0.5	14.572	9	13 24 23.13	2.1812	14 30 23.6	12.823
10	11 46 46.06	1.9976	3 35 34.6	14.564	10	13 26 34.16	2.1866	14 43 10.9	12.754
11	11 48 45.98	1.9999	3 50 8.2	14.556	11	13 28 45.52	2.1921	14 55 54.1	12.683
12	11 50 46.05	2.0024	4 4 41.3	14.546	12	13 30 57.21	2.1976	15 8 32.9	12.611
13	11 52 46.27	2.0048	4 19 13.7	14.535	13	13 33 9.23	2.2032	15 21 7.4	12.537
14	11 54 46.63	2.0073	4 33 45.5	14.524	14	13 35 21.59	2.2088	15 33 37.4	12.463
15	11 56 47.15	2.0100	4 48 16.6	14.512	15	13 37 34.29	2.2145	15 46 2.9	12.387
16	11 58 47.83	2.0127	5 2 46.9	14.497	16	13 39 47.33	2.2203	15 58 23.8	12.308
17	12 0 48.67	2.0153	5 17 16.2	14.481	17	13 42 0.72	2.2261	16 10 39.9	12.228
18	12 2 49.67	2.0182	5 31 44.6	14.465	18	13 44 14.46	2.2319	16 22 51.2	12.147
19	12 4 50.85	2.0211	5 46 12.0	14.448	19	13 46 28.55	2.2377	16 34 57.6	12.065
20	12 6 52.20	2.0239	6 0 38.3	14.428	20	13 48 42.99	2.2437	16 46 59.0	11.981
21	12 8 53.72	2.0269	6 15 3.4	14.408	21	13 50 57.79	2.2497	16 58 55.3	11.895
22	12 10 55.43	2.0301	6 29 27.3	14.387	22	13 53 12.95	2.2556	17 10 46.4	11.808
23	12 12 57.33	2.0333	6 43 49.9	14.364	23	13 55 28.46	2.2615	17 22 32.3	11.720
24	12 14 59.42	2.0365	S. 6 58 11.0	14.340	24	13 57 44.33	2.2676	S. 17 34 12.8	11.630
THURSDAY 10.					SATURDAY 12.				
0	h m s	° ' "	° ' "	° ' "	0	h m s	° ' "	° ' "	° ' "
1	12 17 1.71	2.0398	S. 7 12 30.7	14.315	1	14 0 0.57	2.2737	S. 17 45 47.9	11.539
2	12 19 4.20	2.0432	7 26 48.8	14.289	2	14 2 17.18	2.2798	17 57 17.5	11.446
3	12 21 6.89	2.0466	7 41 5.4	14.262	3	14 4 34.15	2.2860	18 8 41.4	11.351
4	12 23 9.79	2.0501	7 55 20.2	14.232	4	14 6 51.50	2.2922	18 19 59.6	11.255
5	12 25 12.90	2.0537	8 9 33.3	14.202	5	14 9 9.22	2.2984	18 31 12.0	11.158
6	12 27 16.23	2.0573	8 23 44.5	14.171	6	14 11 27.31	2.3047	18 42 18.5	11.058
7	12 29 19.78	2.0611	8 37 53.8	14.138	7	14 13 45.78	2.3109	18 53 19.0	10.957
8	12 31 23.56	2.0649	8 52 1.1	14.104	8	14 16 4.62	2.3172	19 4 13.4	10.856
9	12 33 27.57	2.0688	9 6 6.3	14.069	9	14 18 23.84	2.3235	19 15 1.7	10.753
10	12 35 31.81	2.0727	9 20 9.4	14.033	10	14 20 43.44	2.3298	19 25 43.7	10.647
11	12 37 36.29	2.0767	9 34 10.2	13.994	11	14 23 3.42	2.3362	19 36 19.3	10.540
12	12 39 41.01	2.0808	9 48 8.7	13.956	12	14 25 23.78	2.3425	19 46 48.5	10.432
13	12 41 45.98	2.0849	10 2 4.9	13.916	13	14 27 44.52	2.3488	19 57 11.2	10.323
14	12 43 51.20	2.0891	10 15 58.6	13.874	14	14 30 5.64	2.3552	20 7 27.3	10.212
15	12 45 56.67	2.0933	10 29 49.8	13.831	15	14 32 27.14	2.3615	20 17 36.6	10.098
16	12 48 2.40	2.0977	10 43 38.3	13.786	16	14 34 49.02	2.3679	20 27 39.1	9.984
17	12 50 8.40	2.1022	10 57 24.1	13.740	17	14 37 11.29	2.3743	20 37 34.7	9.869
18	12 52 14.66	2.1066	11 11 7.1	13.693	18	14 39 33.94	2.3807	20 47 23.4	9.752
19	12 54 21.19	2.1112	11 24 47.3	13.646	19	14 41 56.97	2.3870	20 57 4.9	9.633
20	12 56 28.00	2.1157	11 38 24.6	13.596	20	14 44 20.38	2.3933	21 6 39.3	9.512
21	12 58 35.08	2.1203	11 51 58.8	13.544	21	14 46 44.17	2.3997	21 16 6.4	9.391
22	13 0 42.44	2.1251	12 5 29.9	13.492	22	14 49 8.35	2.4061	21 25 26.2	9.268
23	13 2 50.09	2.1299	12 18 57.9	13.439	23	14 51 32.00	2.4123	21 34 38.5	9.143
24	13 4 58.03	2.1348	12 32 22.6	13.383	24	14 53 57.83	2.4187	21 43 43.3	9.017
25	13 7 6.27	2.1397	S. 12 45 43.9	13.327			2.4250	S. 21 52 40.5	8.889

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 13.					TUESDAY 15.				
0	14 56 23.14	2.4250	S. 21 52 40.5	8.889	0	16 58 57.93	2.6475	S. 26 6 36.3	1.264
1	14 58 48.83	2.4312	22 1 30.0	8.759	1	17 1 36.84	2.6494	26 7 46.7	1.083
2	15 1 14.89	2.4374	22 10 11.6	8.628	2	17 4 15.86	2.6511	26 8 46.3	0.903
3	15 3 41.32	2.4437	22 18 45.3	8.496	3	17 6 54.97	2.6527	26 9 35.0	0.721
4	15 6 8.13	2.4499	22 27 11.1	8.363	4	17 9 34.18	2.6542	26 10 12.8	0.539
5	15 8 35.31	2.4560	22 35 28.8	8.227	5	17 12 13.47	2.6554	26 10 39.7	0.357
6	15 11 2.85	2.4621	22 43 38.3	8.090	6	17 14 52.83	2.6565	26 10 55.6	-0.173
7	15 13 30.76	2.4683	22 51 39.6	7.952	7	17 17 32.25	2.6575	26 11 0.5	+0.009
8	15 15 59.04	2.4743	22 59 32.6	7.813	8	17 20 11.73	2.6584	26 10 54.5	0.192
9	15 18 27.67	2.4802	23 7 17.2	7.672	9	17 22 51.26	2.6591	26 10 37.5	0.375
10	15 20 56.66	2.4862	23 14 53.3	7.530	10	17 25 30.82	2.6596	26 10 9.5	0.558
11	15 23 26.01	2.4921	23 22 20.8	7.386	11	17 28 10.41	2.6600	26 9 30.5	0.742
12	15 25 55.71	2.4979	23 29 39.6	7.241	12	17 30 50.02	2.6602	26 8 40.4	0.926
13	15 28 25.76	2.5037	23 36 49.7	7.095	13	17 33 29.63	2.6602	26 7 39.4	1.109
14	15 30 56.15	2.5093	23 43 51.0	6.947	14	17 36 9.24	2.6601	26 6 27.3	1.292
15	15 33 26.88	2.5150	23 50 43.4	6.798	15	17 38 48.84	2.6598	26 5 4.3	1.475
16	15 35 57.95	2.5206	23 57 26.8	6.647	16	17 41 28.42	2.6594	26 3 30.3	1.658
17	15 38 29.35	2.5261	24 4 1.1	6.496	17	17 44 7.97	2.6588	26 1 45.3	1.842
18	15 41 1.08	2.5316	24 10 26.3	6.343	18	17 46 47.48	2.6581	25 59 49.3	2.024
19	15 43 33.14	2.5370	24 16 42.2	6.188	19	17 49 26.94	2.6573	25 57 42.4	2.206
20	15 46 5.52	2.5423	24 22 48.8	6.033	20	17 52 6.35	2.6562	25 55 24.6	2.388
21	15 48 38.21	2.5474	24 28 46.1	5.877	21	17 54 45.69	2.6551	25 52 55.8	2.571
22	15 51 11.21	2.5526	24 34 34.0	5.718	22	17 57 24.96	2.6538	25 50 16.1	2.752
23	15 53 44.52	2.5576	S. 24 40 12.3	5.558	23	18 0 4.15	2.6523	S. 25 47 25.6	2.932
MONDAY 14.					WEDNESDAY 16.				
0	15 56 18.12	2.5625	S. 24 45 41.0	5.398	0	18 2 43.24	2.6507	S. 25 44 24.2	3.113
1	15 58 52.02	2.5674	24 51 0.1	5.237	1	18 5 22.23	2.6489	25 41 12.0	3.294
2	16 1 26.21	2.5722	24 56 9.5	5.074	2	18 8 1.11	2.6470	25 37 48.9	3.474
3	16 4 0.69	2.5769	25 1 9.0	4.910	3	18 10 39.87	2.6449	25 34 15.1	3.653
4	16 6 35.44	2.5814	25 5 58.7	4.746	4	18 13 18.50	2.6427	25 30 30.5	3.832
5	16 9 10.46	2.5858	25 10 38.5	4.580	5	18 15 57.00	2.6404	25 26 35.3	4.009
6	16 11 45.74	2.5902	25 15 8.3	4.413	6	18 18 35.35	2.6379	25 22 29.4	4.187
7	16 14 21.28	2.5944	25 19 28.1	4.246	7	18 21 13.55	2.6353	25 18 12.8	4.364
8	16 16 57.07	2.5986	25 23 37.8	4.077	8	18 23 51.59	2.6326	25 13 45.7	4.539
9	16 19 33.11	2.6026	25 27 37.3	3.907	9	18 26 29.46	2.6298	25 9 8.1	4.714
10	16 22 9.38	2.6064	25 31 26.6	3.736	10	18 29 7.16	2.6267	25 4 20.0	4.889
11	16 24 45.88	2.6102	25 35 5.6	3.563	11	18 31 44.67	2.6236	24 59 21.4	5.063
12	16 27 22.61	2.6140	25 38 34.2	3.391	12	18 34 21.99	2.6203	24 54 12.5	5.235
13	16 29 59.56	2.6175	25 41 52.5	3.218	13	18 36 59.10	2.6168	24 48 53.2	5.407
14	16 32 36.71	2.6208	25 45 0.4	3.044	14	18 39 36.01	2.6134	24 43 23.7	5.578
15	16 35 14.06	2.6241	25 47 57.8	2.869	15	18 42 12.71	2.6097	24 37 43.9	5.748
16	16 37 51.60	2.6273	25 50 44.7	2.693	16	18 44 49.18	2.6059	24 31 54.0	5.917
17	16 40 29.33	2.6303	25 53 21.0	2.517	17	18 47 25.42	2.6021	24 25 53.9	6.085
18	16 43 7.24	2.6332	25 55 46.7	2.340	18	18 50 1.43	2.5981	24 19 43.8	6.251
19	16 45 45.32	2.6359	25 58 1.8	2.162	19	18 52 37.19	2.5940	24 13 23.8	6.416
20	16 48 23.55	2.6385	26 0 6.2	1.984	20	18 55 12.71	2.5898	24 6 53.9	6.581
21	16 51 1.94	2.6410	26 1 59.9	1.805	21	18 57 47.97	2.5855	24 0 14.1	6.745
22	16 53 40.47	2.6433	26 3 42.8	1.626	22	19 0 22.97	2.5811	23 53 24.5	6.907
23	16 56 19.14	2.6455	26 5 15.0	1.446	23	19 2 57.70	2.5766	23 46 25.2	7.068
24	16 58 57.93	2.6475	S. 26 6 36.3	1.264	24	19 5 32.16	2.5720	S. 23 39 16.4	7.227

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 17.					SATURDAY 19.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	19 5 32.16	2.5720	S. 23 39 16.4	7.227	1	21 2 33.34	2.2943	S. 15 16 33.6	13.082
2	19 8 6.34	2.5672	23 31 58.0	7.386	2	21 4 50.82	2.2884	15 3 26.2	13.162
3	19 10 40.23	2.5624	23 24 30.1	7.543	3	21 7 7.95	2.2825	14 50 14.1	13.241
4	19 13 13.83	2.5576	23 16 52.8	7.699	4	21 9 24.72	2.2767	14 36 57.3	13.317
5	19 15 47.14	2.5527	23 9 6.2	7.854	5	21 11 41.15	2.2710	14 23 36.0	13.392
6	19 18 20.15	2.5476	23 1 10.3	8.007	6	21 13 57.24	2.2653	14 10 10.3	13.464
7	19 20 52.85	2.5424	22 53 5.3	8.158	7	21 16 12.98	2.2595	13 56 40.3	13.536
8	19 23 25.24	2.5372	22 44 51.3	8.308	8	21 18 28.38	2.2538	13 43 6.0	13.606
9	19 25 57.32	2.5320	22 36 28.3	8.458	9	21 20 43.44	2.2482	13 29 27.6	13.673
10	19 28 29.08	2.5267	22 27 56.3	8.606	10	21 22 58.16	2.2426	13 15 45.2	13.738
11	19 31 0.52	2.5213	22 19 15.6	8.752	11	21 25 12.55	2.2371	13 1 59.0	13.802
12	19 33 31.63	2.5158	22 10 26.1	8.897	12	21 27 26.61	2.2316	12 48 8.9	13.865
13	19 36 2.41	2.5102	22 1 28.0	9.039	13	21 29 40.34	2.2262	12 34 15.2	13.926
14	19 38 32.86	2.5047	21 52 21.4	9.181	14	21 31 53.75	2.2207	12 20 17.8	13.985
15	19 41 2.97	2.4990	21 43 6.3	9.322	15	21 34 6.83	2.2153	12 6 17.0	14.042
16	19 43 32.74	2.4933	21 33 42.8	9.460	16	21 36 19.59	2.2101	11 52 12.8	14.098
17	19 46 2.17	2.4876	21 24 11.1	9.597	17	21 38 32.04	2.2048	11 38 5.3	14.152
18	19 48 31.25	2.4818	21 14 31.2	9.733	18	21 40 44.17	2.1997	11 23 54.6	14.203
19	19 50 59.98	2.4759	21 4 43.2	9.866	19	21 42 56.00	2.1946	11 9 40.9	14.254
20	19 53 28.36	2.4701	20 54 47.3	9.997	20	21 45 7.52	2.1894	10 55 24.1	14.303
21	19 55 56.39	2.4642	20 44 43.5	10.128	21	21 47 18.73	2.1844	10 41 4.5	14.350
22	19 58 24.06	2.4582	20 34 31.9	10.257	22	21 49 29.65	2.1795	10 26 42.1	14.396
23	20 0 51.37	2.4522	20 24 12.6	10.384	23	21 51 40.27	2.1745	10 12 17.0	14.440
24	20 3 18.33	2.4462	S. 20 13 45.8	10.510	24	21 53 50.59	2.1697	S. 9 57 49.3	14.482
FRIDAY 18.					SUNDAY 20.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	20 5 44.92	2.4402	S. 20 3 11.4	10.634	1	21 56 0.63	2.1649	S. 9 43 19.1	14.523
2	20 8 11.15	2.4344	19 52 29.7	10.756	2	21 58 10.38	2.1601	9 28 46.5	14.562
3	20 10 37.02	2.4281	19 41 40.7	10.876	3	22 0 19.84	2.1554	9 14 11.7	14.598
4	20 13 2.52	2.4220	19 30 44.6	10.994	4	22 2 29.03	2.1508	8 59 34.7	14.634
5	20 15 27.66	2.4159	19 19 41.4	11.112	5	22 4 37.94	2.1463	8 44 55.6	14.668
6	20 17 52.43	2.4098	19 8 31.2	11.227	6	22 6 46.58	2.1418	8 30 14.5	14.701
7	20 20 16.83	2.4037	18 57 14.2	11.340	7	22 8 54.95	2.1373	8 15 31.5	14.732
8	20 22 40.87	2.3975	18 45 50.4	11.452	8	22 11 3.06	2.1329	8 0 46.6	14.762
9	20 25 4.53	2.3913	18 34 19.9	11.562	9	22 13 10.90	2.1286	7 46 0.1	14.789
10	20 27 27.83	2.3853	18 22 42.9	11.671	10	22 15 18.49	2.1244	7 31 11.9	14.816
11	20 29 50.76	2.3791	18 10 59.4	11.777	11	22 17 25.83	2.1203	7 16 22.2	14.840
12	20 32 13.32	2.3729	17 59 9.6	11.882	12	22 19 32.92	2.1161	7 1 31.1	14.863
13	20 34 35.51	2.3668	17 47 13.5	11.986	13	22 21 39.76	2.1120	6 46 38.7	14.884
14	20 36 57.33	2.3607	17 35 11.3	12.087	14	22 23 46.36	2.1080	6 31 45.0	14.905
15	20 39 18.79	2.3546	17 23 3.1	12.186	15	22 25 52.72	2.1041	6 16 50.1	14.924
16	20 41 39.88	2.3485	17 10 49.0	12.283	16	22 27 58.85	2.1003	6 1 54.1	14.941
17	20 44 0.61	2.3424	16 58 29.1	12.379	17	22 30 4.75	2.0965	5 46 57.2	14.956
18	20 46 20.97	2.3363	16 46 3.5	12.473	18	22 32 10.43	2.0928	5 31 59.4	14.970
19	20 48 40.96	2.3302	16 33 32.3	12.566	19	22 34 15.88	2.0891	5 17 0.8	14.983
20	20 51 0.59	2.3242	16 20 55.6	12.657	20	22 36 21.12	2.0855	5 2 1.4	14.995
21	20 53 19.86	2.3182	16 8 13.5	12.745	21	22 38 26.14	2.0820	4 47 1.4	15.004
22	20 55 38.77	2.3122	15 55 26.2	12.832	22	22 40 30.96	2.0786	4 32 0.9	15.012
23	20 57 57.32	2.3062	15 42 33.7	12.917	23	22 42 35.57	2.0752	4 16 59.9	15.020
24	21 0 15.51	2.3002	15 29 36.1	13.001	24	22 44 39.98	2.0718	4 1 58.5	15.025
	21 2 33.34	2.2943	S. 15 16 33.6	13.082		22 46 44.19	2.0686	S. 3 46 56.9	15.029

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 21.					WEDNESDAY 23.				
0	22 46 44.19	2.0686	S. 3 46 56.9	15.029	0	0 23 34.42	1.9913	N. 7 55 7.2	13.782
1	22 48 48.21	2.0634	3 31 55.0	15.032	1	0 25 33.90	1.9913	8 8 52.6	13.730
2	22 50 52.04	2.0623	3 16 53.0	15.033	2	0 27 33.38	1.9913	8 22 34.8	13.677
3	22 52 55.69	2.0593	3 1 51.0	15.033	3	0 29 32.86	1.9913	8 36 13.8	13.622
4	22 54 59.15	2.0563	2 46 49.0	15.032	4	0 31 32.34	1.9914	8 49 49.5	13.567
5	22 57 2.44	2.0534	2 31 47.2	15.029	5	0 33 31.83	1.9916	9 3 21.9	13.512
6	22 59 5.56	2.0506	2 16 45.5	15.026	6	0 35 31.33	1.9917	9 16 50.9	13.455
7	23 1 8.51	2.0478	2 1 44.1	15.020	7	0 37 30.84	1.9920	9 30 16.5	13.397
8	23 3 11.29	2.0451	1 46 43.1	15.013	8	0 39 30.37	1.9924	9 43 38.6	13.339
9	23 5 13.92	2.0425	1 31 42.5	15.006	9	0 41 29.93	1.9928	9 56 57.2	13.280
10	23 7 16.39	2.0399	1 16 42.4	14.997	10	0 43 29.51	1.9932	10 10 12.2	13.220
11	23 9 18.71	2.0374	1 1 42.9	14.986	11	0 45 29.11	1.9936	10 23 23.6	13.158
12	23 11 20.88	2.0350	0 46 44.1	14.974	12	0 47 28.74	1.9942	10 36 31.2	13.096
13	23 13 22.91	2.0327	0 31 46.0	14.961	13	0 49 28.41	1.9948	10 49 35.1	13.033
14	23 15 24.80	2.0303	0 16 48.8	14.946	14	0 51 28.11	1.9953	11 2 35.2	12.969
15	23 17 26.55	2.0281	S. 0 1 52.5	14.931	15	0 53 27.85	1.9960	11 15 31.4	12.905
16	23 19 28.17	2.0259	N. 0 13 2.9	14.914	16	0 55 27.63	1.9967	11 28 23.8	12.840
17	23 21 29.66	2.0238	0 27 57.2	14.896	17	0 57 27.46	1.9975	11 41 12.2	12.773
18	23 23 31.03	2.0218	0 42 50.4	14.877	18	0 59 27.33	1.9983	11 53 56.6	12.706
19	23 25 32.28	2.0199	0 57 42.4	14.856	19	1 1 27.26	1.9993	12 6 36.9	12.638
20	23 27 33.42	2.0180	1 12 33.1	14.834	20	1 3 27.24	2.0001	12 19 13.2	12.570
21	23 29 34.44	2.0162	1 27 22.5	14.812	21	1 5 27.27	2.0011	12 31 45.3	12.501
22	23 31 35.36	2.0145	1 42 10.5	14.787	22	1 7 27.37	2.0021	12 44 13.3	12.431
23	23 33 36.18	2.0128	N. 1 56 57.0	14.762	23	1 9 27.52	2.0031	N. 12 56 37.0	12.359
TUESDAY 22.					THURSDAY 24.				
0	23 35 36.89	2.0111	N. 2 11 42.0	14.737	0	1 11 27.74	2.0043	N. 13 8 56.4	12.287
1	23 37 37.51	2.0096	2 26 25.4	14.709	1	1 13 28.03	2.0053	13 21 11.5	12.215
2	23 39 38.04	2.0082	2 41 7.1	14.680	2	1 15 28.38	2.0065	13 33 22.2	12.142
3	23 41 38.49	2.0068	2 55 47.0	14.650	3	1 17 28.81	2.0078	13 45 28.5	12.068
4	23 43 38.85	2.0053	3 10 25.1	14.619	4	1 19 29.31	2.0090	13 57 30.3	11.992
5	23 45 39.13	2.0041	3 25 1.3	14.587	5	1 21 29.89	2.0103	14 9 27.6	11.917
6	23 47 39.34	2.0028	3 39 35.6	14.555	6	1 23 30.54	2.0116	14 21 20.3	11.840
7	23 49 39.47	2.0017	3 54 7.9	14.521	7	1 25 31.28	2.0130	14 33 8.4	11.763
8	23 51 39.54	2.0006	4 8 38.1	14.485	8	1 27 32.10	2.0144	14 44 51.9	11.686
9	23 53 39.54	1.9995	4 23 6.1	14.448	9	1 29 33.01	2.0159	14 56 30.7	11.607
10	23 55 39.48	1.9985	4 37 31.9	14.412	10	1 31 34.01	2.0174	15 8 4.8	11.528
11	23 57 39.36	1.9977	4 51 55.5	14.373	11	1 33 35.10	2.0188	15 19 34.1	11.447
12	23 59 39.20	1.9968	5 6 16.7	14.333	12	1 35 36.27	2.0203	15 30 58.5	11.367
13	0 1 38.98	1.9960	5 20 35.5	14.293	13	1 37 37.54	2.0220	15 42 18.1	11.286
14	0 3 38.72	1.9953	5 34 51.9	14.252	14	1 39 38.91	2.0237	15 53 32.8	11.203
15	0 5 38.42	1.9947	5 49 5.7	14.209	15	1 41 40.38	2.0253	16 4 42.5	11.121
16	0 7 38.08	1.9940	6 3 17.0	14.167	16	1 43 41.95	2.0271	16 15 47.3	11.037
17	0 9 37.70	1.9935	6 17 25.7	14.122	17	1 45 43.63	2.0288	16 26 47.0	10.953
18	0 11 37.30	1.9931	6 31 31.6	14.076	18	1 47 45.41	2.0305	16 37 41.7	10.868
19	0 13 36.87	1.9926	6 45 34.8	14.029	19	1 49 47.29	2.0323	16 48 31.2	10.783
20	0 15 36.41	1.9923	6 59 35.1	13.982	20	1 51 49.28	2.0342	16 59 15.6	10.697
21	0 17 35.94	1.9920	7 13 32.6	13.933	21	1 53 51.39	2.0360	17 9 54.8	10.609
22	0 19 35.45	1.9917	7 27 27.1	13.884	22	1 55 53.60	2.0378	17 20 28.7	10.522
23	0 21 34.94	1.9914	7 41 18.7	13.834	23	1 57 55.92	2.0397	17 30 57.4	10.433
24	0 23 34.42	1.9913	N. 7 55 7.2	13.782	24	1 59 58.36	2.0417	N. 17 41 20.7	10.344

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 25.					SUNDAY 27.				
0	h m s	s	N. 17 41 20.7	10.344	0	h m s	s	N. 24 4 8.6	5.400
1	2 2 0.92	2.0436	17 51 38.7	10.255	1	3 40 25.61	2.1442	24 9 29.2	5.286
2	2 4 3.59	2.0455	18 1 51.3	10.164	2	3 42 34.33	2.1462	24 14 42.9	5.170
3	2 6 6.38	2.0475	18 11 58.4	10.073	3	3 44 43.16	2.1481	24 19 49.6	5.054
4	2 8 9.29	2.0495	18 22 0.1	9.982	4	3 46 52.10	2.1499	24 24 49.4	4.938
5	2 10 12.32	2.0516	18 31 56.3	9.890	5	3 49 1.15	2.1518	24 29 42.2	4.822
6	2 12 15.48	2.0537	18 41 46.9	9.798	6	3 51 10.32	2.1537	24 34 28.0	4.705
7	2 14 18.76	2.0557	18 51 32.0	9.704	7	3 53 19.60	2.1555	24 39 6.8	4.587
8	2 16 22.16	2.0578	19 1 11.4	9.610	8	3 55 28.98	2.1573	24 43 38.5	4.470
9	2 18 25.69	2.0598	19 10 45.2	9.516	9	3 57 38.47	2.1591	24 48 3.2	4.353
10	2 20 29.34	2.0619	19 20 13.3	9.421	10	3 59 48.07	2.1608	24 52 20.8	4.234
11	2 22 33.12	2.0641	19 29 35.7	9.325	11	4 1 57.77	2.1625	24 56 31.3	4.116
12	2 24 37.03	2.0663	19 38 52.3	9.228	12	4 4 7.57	2.1642	25 0 34.7	3.997
13	2 26 41.07	2.0684	19 48 3.1	9.131	13	4 6 17.47	2.1658	25 4 30.9	3.877
14	2 28 45.24	2.0706	19 57 8.0	9.033	14	4 8 27.46	2.1673	25 8 20.0	3.758
15	2 30 49.54	2.0728	20 6 7.1	8.936	15	4 10 37.55	2.1689	25 12 1.9	3.638
16	2 32 53.97	2.0749	20 15 0.3	8.837	16	4 12 47.73	2.1704	25 15 36.6	3.518
17	2 34 58.53	2.0772	20 23 47.5	8.737	17	4 14 58.00	2.1719	25 19 4.1	3.397
18	2 37 3.23	2.0794	20 32 28.8	8.638	18	4 17 8.36	2.1733	25 22 24.3	3.277
19	2 39 8.06	2.0816	20 41 4.1	8.538	19	4 19 18.80	2.1748	25 25 37.3	3.157
20	2 41 13.02	2.0838	20 49 33.3	8.436	20	4 21 29.33	2.1762	25 28 43.1	3.036
21	2 43 18.11	2.0860	20 57 56.4	8.334	21	4 23 39.94	2.1774	25 31 41.6	2.913
22	2 45 23.34	2.0882	21 6 13.4	8.232	22	4 25 50.62	2.1787	25 34 32.7	2.792
23	2 47 28.70	2.0904	N. 21 14 24.3	8.130	23	4 28 1.38	2.1800	N. 25 37 16.6	2.670
SATURDAY 26.					MONDAY 28.				
0	2 49 34.19	2.0927	N. 21 22 29.0	8.027	0	4 32 23.12	2.1823	N. 25 39 53.1	2.548
1	2 51 39.82	2.0950	21 30 27.5	7.922	1	4 34 34.10	2.1835	25 42 22.3	2.426
2	2 53 45.59	2.0973	21 38 19.7	7.818	2	4 36 45.14	2.1845	25 44 44.2	2.303
3	2 55 51.49	2.0994	21 46 5.7	7.713	3	4 38 56.24	2.1855	25 46 58.7	2.180
4	2 57 57.52	2.1017	21 53 45.3	7.608	4	4 41 7.40	2.1865	25 49 5.8	2.057
5	3 0 3.69	2.1039	22 1 18.6	7.502	5	4 43 18.62	2.1874	25 51 5.6	1.935
6	3 2 9.99	2.1061	22 8 45.5	7.396	6	4 45 29.89	2.1883	25 52 58.0	1.812
7	3 4 16.42	2.1083	22 16 6.1	7.289	7	4 47 41.22	2.1892	25 54 43.0	1.687
8	3 6 22.99	2.1106	22 23 20.2	7.182	8	4 49 52.59	2.1899	25 56 20.5	1.564
9	3 8 29.69	2.1128	22 30 27.9	7.074	9	4 52 4.01	2.1907	25 57 50.7	1.442
10	3 10 36.52	2.1149	22 37 29.1	6.965	10	4 54 15.47	2.1914	25 59 13.5	1.318
11	3 12 43.48	2.1172	22 44 23.7	6.856	11	4 56 26.98	2.1921	26 0 28.8	1.193
12	3 14 50.58	2.1194	22 51 11.8	6.747	12	4 58 38.52	2.1926	26 1 36.7	1.069
13	3 16 57.81	2.1215	22 57 53.4	6.637	13	5 0 50.09	2.1932	26 2 37.1	0.945
14	3 19 5.16	2.1236	23 4 28.3	6.527	14	5 3 1.70	2.1937	26 3 30.1	0.821
15	3 21 12.64	2.1258	23 10 56.6	6.416	15	5 5 13.34	2.1942	26 4 15.6	0.697
16	3 23 20.25	2.1279	23 17 18.2	6.305	16	5 7 25.00	2.1946	26 4 53.7	0.572
17	3 25 27.99	2.1300	23 23 33.2	6.194	17	5 9 36.69	2.1949	26 5 24.3	0.447
18	3 27 35.85	2.1321	23 29 41.5	6.082	18	5 11 48.39	2.1952	26 5 47.4	0.323
19	3 29 43.84	2.1342	23 35 43.0	5.968	19	5 14 0.11	2.1955	26 6 3.1	0.199
20	3 31 51.95	2.1362	23 41 37.7	5.856	20	5 16 11.85	2.1957	26 6 11.3	+0.074
21	3 34 0.18	2.1383	23 47 25.7	5.743	21	5 18 23.60	2.1958	26 6 12.0	-0.050
22	3 36 8.54	2.1403	23 53 6.9	5.629	22	5 20 35.35	2.1959	26 6 5.3	0.174
23	3 38 17.02	2.1423	23 58 41.2	5.514	23	5 22 47.11	2.1961	26 5 51.1	0.299
24	3 40 25.61	2.1442	N. 24 4 8.6	5.400	24	5 24 58.88	2.1961	N. 26 5 29.4	0.424

GREENWICH MEAN TIME.

## PHASES OF THE MOON.

	d	h	m
☉ Full Moon . . . . . Feb.	6	6	24.2
☾ Last Quarter . . . . .	13	12	34.7
☀ New Moon . . . . .	20	7	40.6
☽ First Quarter . . . . .	27	23	13.3

( Perigee . . . . .	Feb.	<sup>d</sup> 16	<sup>h</sup> 19.3
( Apogee . . . . .		28	17.2

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
1	SUN W.	121 26 45	3466	122 47 47	3463	124 8 52	3462	125 29 59	3459
	α Pegasi W.	81 25 13	3230	82 50 47	3226	84 16 25	3224	85 42 6	3220
	α Arietis W.	38 13 23	3114	39 41 16	3109	41 9 15	3105	42 37 19	3101
	Pollux E.	37 33 52	3147	36 6 39	3150	34 39 30	3153	33 12 25	3158
	Regulus E.	74 12 10	3082	72 43 39	3081	71 15 6	3079	69 46 31	3076
	JUPITER E.	115 48 3	3100	114 19 53	3097	112 51 40	3094	111 23 23	3091
	Spica E.	128 14 59	3086	126 46 32	3084	125 18 3	3081	123 49 30	3078
2	SUN W.	132 16 31	3438	133 38 4	3434	134 59 42	3428	136 21 27	3423
	α Pegasi W.	92 51 33	3201	94 17 41	3198	95 43 53	3193	97 10 10	3188
	α Arietis W.	49 59 6	3074	51 27 47	3069	52 56 35	3062	54 25 31	3056
	Aldebaran W.	19 27 53	3607	20 46 20	3530	22 6 11	3466	23 27 13	3413
	Regulus E.	62 22 37	3058	60 53 36	3054	59 24 30	3049	57 55 18	3043
	JUPITER E.	104 0 48	3069	102 32 0	3063	101 3 5	3058	99 34 4	3052
	Spica E.	116 25 43	3058	114 56 42	3053	113 27 35	3047	111 58 21	3042
3	α Pegasi W.	104 22 59	3166	105 49 49	3161	107 16 45	3157	108 43 46	3153
	α Arietis W.	61 52 9	3022	63 21 55	3014	64 51 50	3006	66 21 55	2998
	Aldebaran W.	30 25 12	3231	31 50 44	3205	33 16 47	3183	34 43 17	3160
	Regulus E.	50 27 35	3015	48 57 41	3008	47 27 38	3001	45 57 27	2994
	JUPITER E.	92 7 2	3019	90 37 13	3012	89 7 15	3005	87 37 8	2997
	Spica E.	104 30 20	3009	103 0 19	3003	101 30 10	2996	99 59 52	2988
4	α Pegasi W.	116 0 7	3133	117 27 37	3129	118 55 11	3127	120 22 48	3124
	α Arietis W.	73 54 51	2957	75 25 58	2948	76 57 16	2939	78 28 45	2931
	Aldebaran W.	42 1 49	3070	43 30 35	3055	44 59 40	3039	46 29 4	3025
	Regulus E.	38 24 20	2959	36 53 16	2952	35 22 3	2945	33 50 41	2938
	JUPITER E.	80 4 8	2958	78 33 2	2949	77 1 45	2941	75 30 18	2932
	Spica E.	92 25 53	2947	90 54 34	2939	89 23 5	2931	87 51 25	2921
5	α Arietis W.	86 9 2	2884	87 41 41	2875	89 14 32	2866	90 47 35	2857
	Aldebaran W.	54 0 24	2958	55 31 29	2946	57 2 50	2933	58 34 27	2921
	JUPITER E.	67 50 19	2889	66 17 46	2880	64 45 2	2872	63 12 7	2864
	Spica E.	80 10 13	2876	78 37 24	2867	77 4 23	2858	75 31 10	2849
	Antares E.	125 54 54	2870	124 21 57	2860	122 48 47	2852	121 15 26	2842
	SATURN E.	128 26 28	2927	126 54 43	2916	125 22 44	2905	123 50 32	2894
6	α Arietis W.	98 35 48	2810	100 10 3	2801	101 44 30	2792	103 19 9	2782
	Aldebaran W.	66 16 16	2863	67 49 22	2852	69 22 42	2842	70 56 16	2831
	Pollux W.	24 17 4	2941	25 48 31	2915	27 20 31	2892	28 53 0	2878
	JUPITER E.	55 24 52	2823	53 50 54	2815	52 16 45	2807	50 42 26	2800
	Spica E.	67 42 8	2802	66 7 43	2793	64 33 6	2784	62 58 17	2775
	Antares E.	113 25 36	2795	111 51 1	2785	110 16 14	2776	108 41 15	2766
	SATURN E.	116 6 10	2843	114 32 38	2832	112 58 52	2823	111 24 54	2812
7	α Arietis W.	111 15 23	2738	112 51 13	2729	114 27 15	2720	116 3 28	2711
	Aldebaran W.	78 47 27	2780	80 22 21	2771	81 57 27	2761	83 32 46	2751
	Pollux W.	36 41 22	2789	38 16 4	2775	39 51 4	2762	41 26 22	2750
	JUPITER E.	42 48 37	2768	41 13 27	2763	39 38 10	2758	38 2 47	2755
	Spica E.	55 1 13	2730	53 25 13	2721	51 49 1	2713	50 12 38	2704
	Antares E.	100 43 12	2720	99 6 59	2710	97 30 33	2702	95 53 56	2692
	SATURN E.	103 31 47	2763	101 56 31	2754	100 21 3	2745	98 45 23	2735



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
1	SUN W.	126 51 9	3455	128 12 23	3452	129 33 41	3447	130 55 4	3444
	α Pegasi W.	87 7 51	3217	88 33 40	3214	89 59 33	3209	91 25 31	3206
	α Arietis W.	44 5 28	3096	45 33 43	3091	47 2 4	3085	48 30 32	3080
	Pollux E.	31 45 26	3163	30 18 32	3168	28 51 45	3175	27 25 6	3183
	Regulus E.	68 17 52	3073	66 49 10	3069	65 20 23	3066	63 51 32	3063
	JUPITER E.	109 55 2	3087	108 26 37	3082	106 58 6	3078	105 29 30	3073
	Spica E.	122 20 54	3074	120 52 13	3071	119 23 28	3067	117 54 38	3063
2	SUN W.	137 43 18	3416	139 5 16	3410	140 27 21	3404	141 49 33	3397
	α Pegasi W.	98 36 33	3184	100 3 1	3179	101 29 35	3175	102 56 14	3170
	α Arietis W.	55 54 34	3050	57 23 45	3043	58 53 4	3036	60 22 32	3029
	Aldebaran W.	24 49 15	3366	26 12 10	3326	27 35 51	3291	29 0 13	3259
	Regulus E.	56 25 59	3038	54 56 33	3033	53 27 1	3027	51 57 22	3021
	JUPITER E.	98 4 55	3046	96 35 39	3039	95 6 15	3033	93 36 43	3026
	Spica E.	110 29 0	3036	108 59 32	3030	107 29 56	3023	106 0 12	3017
3	α Pegasi W.	110 10 52	3148	111 38 4	3144	113 5 20	3140	114 32 41	3136
	α Arietis W.	67 52 10	2990	69 22 35	2982	70 53 10	2974	72 23 55	2965
	Aldebaran W.	36 10 14	3140	37 37 35	3122	39 5 18	3104	40 33 23	3087
	Regulus E.	44 27 7	2987	42 56 38	2981	41 26 1	2973	39 55 15	2966
	JUPITER E.	86 6 52	2989	84 36 26	2981	83 5 50	2973	81 35 4	2965
	Spica E.	98 29 24	2981	96 58 47	2972	95 27 59	2964	93 57 1	2956
4	α Pegasi W.	121 50 28	3123	123 18 10	3122	124 45 53	3121	126 13 37	3121
	α Arietis W.	80 0 25	2921	81 32 17	2912	83 4 20	2903	84 36 35	2894
	Aldebaran W.	47 58 46	3010	49 28 46	2997	50 59 2	2984	52 29 35	2971
	Regulus E.	32 19 10	2931	30 47 31	2924	29 15 43	2918	27 43 47	2912
	JUPITER E.	73 58 40	2924	72 26 51	2915	70 54 51	2907	69 22 41	2898
	Spica E.	86 19 33	2912	84 47 30	2904	83 15 16	2894	81 42 50	2886
5	α Arietis W.	92 20 49	2848	93 54 15	2838	95 27 54	2828	97 1 45	2819
	Aldebaran W.	60 6 19	2909	61 38 26	2898	63 10 48	2886	64 43 25	2875
	JUPITER E.	61 39 2	2855	60 5 45	2847	58 32 18	2838	56 58 40	2831
	Spica E.	73 57 46	2840	72 24 10	2830	70 50 21	2821	69 16 21	2811
	Antares E.	119 41 52	2832	118 8 6	2823	116 34 8	2814	114 59 58	2805
	SATURN E.	122 18 6	2884	120 45 27	2874	119 12 35	2863	117 39 29	2853
6	α Arietis W.	104 54 0	2773	106 29 3	2764	108 4 18	2755	109 39 45	2747
	Aldebaran W.	72 30 3	2821	74 4 4	2810	75 38 19	2800	77 12 47	2791
	Pollux W.	30 25 55	2853	31 59 14	2835	33 32 56	2819	35 6 59	2804
	JUPITER E.	49 7 58	2792	47 33 20	2786	45 58 34	2779	44 23 39	2774
	Spica E.	61 23 16	2766	59 48 3	2756	58 12 38	2747	56 37 1	2739
	Antares E.	107 6 3	2757	105 30 39	2747	103 55 2	2738	102 19 13	2729
	SATURN E.	109 50 42	2802	108 16 17	2793	106 41 40	2783	105 6 50	2773
7	α Arietis W.	117 39 53	2703	119 16 29	2695	120 53 16	2687	122 30 14	2679
	Aldebaran W.	85 8 18	2742	86 44 2	2733	88 19 58	2724	89 56 6	2716
	Pollux W.	43 1 56	2737	44 37 47	2725	46 13 53	2713	47 50 15	2703
	JUPITER E.	36 27 20	2752	34 51 49	2750	33 16 16	2750	31 40 42	2749
	Spica E.	48 36 4	2696	46 59 19	2687	45 22 22	2679	43 45 14	2672
	Antares E.	94 17 6	2684	92 40 5	2675	91 2 51	2666	89 25 25	2657
	SATURN E.	97 9 30	2726	95 33 25	2717	93 57 8	2708	92 20 39	2699

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
8	Aldebaran W.	91 32 25	2707	93 8 55	2698	94 45 37	2690	96 22 30	2682
	Pollux W.	49 26 51	2692	51 3 42	2681	52 40 47	2671	54 18 6	2660
	Spica E.	42 7 56	2664	40 30 28	2656	38 52 49	2649	37 15 0	2642
	Antares E.	87 47 48	2649	86 9 59	2640	84 31 59	2632	82 53 47	2623
	SATURN E.	90 43 58	2690	89 7 5	2682	87 30 1	2673	85 52 45	2665
9	Aldebaran W.	104 29 33	2644	106 7 28	2638	107 45 32	2631	109 23 45	2624
	Pollux W.	62 27 59	2614	64 6 35	2604	65 45 24	2596	67 24 24	2588
	Regulus W.	25 25 49	2617	27 4 21	2605	28 43 9	2594	30 22 12	2583
	Antares E.	74 39 56	2582	73 0 36	2574	71 21 6	2566	69 41 24	2559
	SATURN E.	77 43 37	2624	76 5 15	2616	74 26 42	2608	72 47 58	2601
10	Pollux W.	75 42 19	2546	77 22 28	2539	79 2 47	2530	80 43 18	2523
	Regulus W.	38 40 55	2537	40 21 17	2527	42 1 52	2519	43 42 39	2511
	Antares E.	61 20 15	2520	59 39 29	2512	57 58 33	2505	56 17 27	2497
	SATURN E.	64 31 47	2564	62 52 3	2558	61 12 10	2551	59 32 8	2544
	α Aquilæ E.	112 54 43	2507	111 28 42	3183	110 2 13	3162	108 35 18	3141
	MARS E.	112 56 21	2775	111 21 21	2768	109 46 11	2760	108 10 51	2752
	SUN E.	134 50 11	2863	133 17 5	2855	131 43 48	2847	130 10 21	2838
11	Pollux W.	89 8 28	2486	90 50 1	2479	92 31 44	2472	94 13 37	2465
	Regulus W.	52 9 22	2471	53 51 16	2464	55 33 20	2456	57 15 35	2448
	Antares E.	47 49 19	2461	46 7 11	2454	44 24 53	2447	42 42 25	2439
	SATURN E.	51 9 43	2514	49 28 49	2509	47 47 48	2503	46 6 39	2498
	MARS E.	100 11 34	2713	98 35 12	2706	96 58 40	2698	95 21 58	2691
	α Aquilæ E.	101 15 3	3058	99 46 2	3044	98 16 44	3032	96 47 11	3021
	SUN E.	122 20 28	2798	120 45 58	2791	119 11 18	2783	117 36 28	2775
12	Pollux W.	102 45 27	2431	104 28 18	2424	106 11 18	2418	107 54 27	2412
	Regulus W.	65 49 29	2412	67 32 46	2405	69 16 14	2398	70 59 52	2391
	JUPITER W.	25 14 53	2535	26 55 18	2511	28 36 16	2489	30 17 44	2470
	Antares E.	34 7 33	2405	32 24 5	2398	30 40 27	2391	28 56 40	2384
	MARS E.	87 15 59	2654	85 38 17	2647	84 0 26	2639	82 22 24	2632
	α Aquilæ E.	89 16 19	2978	87 45 39	2973	86 14 53	2969	84 44 1	2965
	SUN E.	109 39 45	2737	108 3 54	2730	106 27 54	2722	104 51 43	2715
13	Regulus W.	79 40 32	2356	81 25 10	2350	83 9 57	2343	84 54 54	2337
	JUPITER W.	38 50 55	2399	40 34 31	2388	42 18 23	2377	44 2 31	2366
	Spica W.	25 41 55	2382	27 25 55	2373	29 10 9	2363	30 54 37	2353
	MARS E.	74 9 51	2597	72 30 52	2590	70 51 43	2583	69 12 25	2576
	α Aquilæ E.	77 8 57	2962	75 37 57	2965	74 7 1	2970	72 36 11	2976
	SUN E.	96 48 24	2678	95 11 15	2671	93 33 56	2664	91 56 28	2657
14	Regulus W.	93 41 58	2305	95 27 50	2300	97 13 50	2294	98 59 59	2288
	JUPITER W.	52 46 40	2322	54 32 8	2314	56 17 47	2307	58 3 37	2299
	Spica W.	39 40 4	2314	41 25 43	2307	43 11 32	2300	44 57 31	2294
	MARS E.	60 53 37	2544	59 13 25	2538	57 33 4	2532	55 52 35	2526
	α Aquilæ E.	65 4 29	3030	63 34 54	3047	62 5 39	3066	60 36 48	3080
	SUN E.	83 46 50	2624	82 8 28	2618	80 29 57	2612	78 51 18	2605
15	JUPITER W.	66 55 21	2266	68 42 10	2261	70 29 7	2256	72 16 12	2251
	Spica W.	53 49 43	2264	55 36 35	2260	57 23 34	2254	59 10 41	2250

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
8	Aldebaran W.	97 59 34	2675	99 36 48	2666	101 14 13	2659	102 51 48	2652
	Pollux W.	55 55 39	2651	57 33 25	2641	59 11 24	2632	60 49 35	2623
	Spica E.	35 37 2	2635	33 58 55	2629	32 20 39	2623	30 42 15	2616
	Antares E.	81 15 23	2615	79 36 48	2607	77 58 2	2599	76 19 5	2590
	SATURN E.	84 15 18	2657	82 37 40	2648	80 59 50	2640	79 21 49	2632
9	Aldebaran W.	111 2 7	2618	112 40 38	2612	114 19 17	2606	115 58 4	2600
	Pollux W.	69 3 36	2579	70 43 0	2571	72 22 35	2563	74 2 21	2554
	Regulus W.	32 1 30	2573	33 41 2	2564	35 20 47	2554	37 0 45	2545
	Antares E.	68 1 32	2551	66 21 29	2543	64 41 15	2535	63 0 50	2527
	SATURN E.	71 9 4	2593	69 29 59	2586	67 50 45	2579	66 11 21	2572
10	Pollux W.	82 23 59	2513	84 4 51	2508	85 45 53	2501	87 27 5	2493
	Regulus W.	45 23 37	2503	47 4 46	2494	48 46 7	2487	50 27 39	2479
	Antares E.	54 36 10	2490	52 54 43	2482	51 13 5	2475	49 31 17	2468
	SATURN E.	57 51 56	2538	56 11 35	2532	54 31 6	2526	52 50 29	2520
	α Aquilæ E.	107 7 58	3122	105 40 15	3105	104 12 11	3088	102 43 47	3072
	MARS E.	106 35 20	2744	104 59 39	2736	103 23 47	2729	101 47 46	2721
	SUN E.	128 36 43	2831	127 2 55	2822	125 28 56	2815	123 54 47	2807
11	Pollux W.	95 55 39	2458	97 37 52	2451	99 20 14	2444	101 2 46	2438
	Regulus W.	58 58 1	2441	60 40 37	2433	62 23 24	2426	64 6 21	2419
	Antares E.	40 59 46	2432	39 16 57	2426	37 33 59	2419	35 50 51	2412
	SATURN E.	44 25 23	2494	42 44 1	2489	41 2 32	2485	39 20 58	2481
	MARS E.	93 45 6	2684	92 8 4	2676	90 30 52	2669	88 53 30	2662
	α Aquilæ E.	95 17 24	3010	93 47 24	3001	92 17 12	2993	90 46 50	2985
	SUN E.	116 1 28	2768	114 26 18	2760	112 50 57	2752	111 15 26	2744
12	Pollux W.	109 37 45	2405	111 21 12	2399	113 4 48	2394	114 48 32	2388
	Regulus W.	72 43 40	2384	74 27 38	2377	76 11 46	2370	77 56 4	2363
	JUPITER W.	31 59 39	2454	33 41 57	2438	35 24 37	2424	37 7 37	2412
	Antares E.	27 12 43	2378	25 28 36	2371	23 44 20	2364	21 59 54	2358
	MARS E.	80 44 13	2625	79 5 52	2618	77 27 21	2611	75 48 41	2604
	α Aquilæ E.	83 13 4	2962	81 42 4	2961	80 11 2	2960	78 39 59	2961
	SUN E.	103 15 23	2707	101 38 53	2700	100 2 13	2692	98 25 23	2686
13	Regulus W.	86 40 0	2330	88 25 16	2324	90 10 41	2317	91 56 15	2311
	JUPITER W.	45 46 54	2357	47 31 31	2348	49 16 21	2339	51 1 24	2330
	Spica W.	32 39 19	2345	34 24 13	2337	36 9 19	2329	37 54 36	2322
	MARS E.	67 32 57	2570	65 53 21	2563	64 13 35	2556	62 33 40	2551
	α Aquilæ E.	71 5 28	2983	69 34 54	2993	68 4 32	3003	66 34 23	3015
	SUN E.	90 18 51	2650	88 41 4	2643	87 3 8	2637	85 25 3	2631
14	Regulus W.	100 46 16	2285	102 32 41	2277	104 19 14	2272	106 5 55	2267
	JUPITER W.	59 49 38	2292	61 35 49	2285	63 22 10	2279	65 8 41	2272
	Spica W.	46 43 39	2287	48 29 57	2281	50 16 24	2276	52 2 59	2270
	MARS E.	54 11 58	2520	52 31 13	2515	50 50 20	2510	49 9 20	2504
	α Aquilæ E.	59 8 25	3114	57 40 32	3143	56 13 14	3174	54 46 34	3210
	SUN E.	77 12 30	2599	75 33 34	2594	73 54 31	2588	72 15 20	2583
15	JUPITER W.	74 3 24	2246	75 50 43	2241	77 38 9	2237	79 25 41	2234
	Spica W.	60 57 54	2245	62 45 14	2241	64 32 40	2237	66 20 12	2234

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
15	MARS E.	47 28 13	2499	45 46 59	2494	44 5 38	2489	42 24 10	2486
	α Aquilæ E.	53 20 37	3251	51 55 28	3297	50 31 13	3348	49 7 57	3406
	SUN E.	70 36 2	2577	68 56 36	2573	67 17 4	2569	65 37 26	2564
16	JUPITER W.	81 13 18	2231	83 1 0	2227	84 48 47	2225	86 36 38	2222
	Spica W.	68 7 49	2231	69 55 31	2228	71 43 17	2225	73 31 7	2223
	Antares W.	22 20 36	2225	24 8 27	2222	25 56 22	2219	27 44 21	2217
	MARS E.	33 55 35	2470	32 13 39	2468	30 31 41	2466	28 49 40	2465
	SUN E.	57 17 49	2516	55 37 40	2543	53 57 27	2541	52 17 11	2539
17	JUPITER W.	95 36 36	2216	97 24 40	2216	99 12 43	2217	101 0 45	2218
	Spica W.	82 30 59	2216	84 19 2	2216	86 7 5	2217	87 55 7	2218
	Antares W.	36 44 56	2211	38 33 7	2210	40 21 19	2210	42 9 31	2212
	SATURN W.	33 40 16	2288	35 26 33	2283	37 12 57	2279	38 59 28	2276
	SUN E.	43 55 24	2536	42 15 1	2538	40 34 40	2539	38 54 21	2540
18	Spica W.	96 54 49	2228	98 42 35	2231	100 30 16	2235	102 17 52	2239
	Antares W.	51 9 58	2222	52 57 53	2225	54 45 43	2229	56 33 28	2233
	SATURN W.	47 52 48	2272	49 39 29	2273	51 26 8	2275	53 12 44	2278
	SUN E.	30 33 42	2561	28 53 53	2566	27 14 12	2574	25 34 42	2583
22	SUN W.	21 47 1	2912	23 19 5	2924	24 50 54	2935	26 22 28	2948
	α Arietis E.	40 59 3	2569	39 19 26	2587	37 40 13	2605	36 1 25	2624
	Aldebaran E.	73 40 2	2594	72 0 59	2610	70 22 18	2626	68 43 59	2643
	Pollux E.	115 41 26	2563	114 1 40	2577	112 22 13	2591	110 43 6	2605
23	SUN W.	33 56 2	3020	35 25 50	3034	36 55 20	3051	38 24 30	3065
	Aldebaran E.	60 38 5	2729	59 2 4	2747	57 26 26	2765	55 51 12	2783
	Pollux E.	102 32 25	2679	100 55 17	2693	99 18 28	2709	97 42 0	2723
24	SUN W.	45 45 41	3143	47 12 59	3158	48 39 59	3173	50 6 41	3188
	Aldebaran E.	48 1 8	2879	46 28 22	2899	44 56 2	2920	43 24 8	2941
	Pollux E.	89 44 34	2798	88 10 3	2812	86 35 51	2826	85 1 57	2841
25	SUN W.	57 15 51	3258	58 40 52	3271	60 5 37	3284	61 30 7	3296
	Aldebaran E.	35 51 35	3058	34 22 34	3085	32 54 6	3114	31 26 13	3145
	Pollux E.	77 16 57	2908	75 44 48	2921	74 12 56	2933	72 41 19	2946
	Regulus E.	114 12 47	2889	112 40 14	2901	111 7 56	2912	109 35 53	2924
26	SUN W.	68 29 7	3354	69 52 16	3365	71 15 13	3375	72 37 58	3384
	Pollux E.	65 7 0	3002	63 36 50	3013	62 6 53	3022	60 37 8	3032
	Regulus E.	101 59 12	2977	100 28 31	2986	98 58 1	2996	97 27 43	3004
27	SUN W.	79 29 17	3423	80 51 7	3430	82 12 50	3436	83 34 26	3441
	α Arietis W.	22 41 17	3136	24 8 43	3130	25 36 16	3126	27 3 54	3124
	Pollux E.	53 11 15	3076	51 42 36	3083	50 14 6	3091	48 45 45	3098
	Regulus E.	89 58 41	3041	88 29 19	3047	87 0 4	3052	85 30 56	3057
28	SUN W.	90 21 6	3461	91 42 14	3463	93 3 20	3464	94 24 24	3466
	α Arietis W.	34 22 42	3115	35 50 33	3114	37 18 26	3113	38 46 20	3111
	Pollux E.	41 26 3	3129	39 58 29	3136	38 31 3	3142	37 3 44	3148
	Regulus E.	78 6 35	3075	76 37 55	3077	75 9 17	3078	73 40 41	3080

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
15	MARS E.	40 42 37	2482	39 0 58	2479	37 19 15	2475	35 37 27	2472
	α Aquilæ E.	47 45 47	2471	46 24 50	2544	45 5 14	2526	43 47 8	2519
	SUN E.	63 57 41	2560	62 17 51	2556	60 37 55	2552	58 57 54	2549
16	JUPITER W.	88 24 33	2220	90 12 31	2218	92 0 31	2217	93 48 33	2216
	Spica W.	75 19 1	2221	77 6 57	2219	78 54 56	2218	80 42 57	2217
	Antares W.	29 32 23	2215	31 20 28	2213	33 8 36	2212	34 56 45	2211
	MARS E.	27 7 37	2464	25 25 33	2465	23 43 30	2465	22 1 28	2467
	SUN E.	50 36 52	2538	48 56 32	2537	47 16 10	2536	45 35 47	2536
17	JUPITER W.	102 48 46	2220	104 36 44	2221	106 24 40	2224	108 12 32	2227
	Spica W.	89 43 8	2219	91 31 7	2220	93 19 4	2223	95 6 58	2225
	Antares W.	43 57 41	2212	45 45 50	2214	47 33 56	2216	49 21 59	2219
	SATURN W.	40 46 3	2273	42 32 42	2272	44 19 23	2271	46 6 5	2270
	SUN E.	37 14 4	2543	35 33 51	2546	33 53 42	2551	32 13 39	2555
18	Spica W.	104 5 21	2244	105 52 43	2249	107 39 58	2255	109 27 4	2262
	Antares W.	58 21 7	2237	60 8 39	2243	61 56 3	2248	63 43 19	2254
	SATURN W.	54 59 16	2281	56 45 43	2285	58 32 4	2289	60 18 19	2295
	SUN E.	23 55 23	2593	22 16 18	2604	20 37 29	2618	18 58 58	2634
22	SUN W.	27 53 46	2662	29 24 47	2676	30 55 30	2690	32 25 55	2705
	α Arietis E.	34 23 42	2643	32 45 6	2663	31 7 36	2684	29 30 34	2705
	Aldebaran E.	67 6 3	2660	65 28 29	2677	63 51 18	2694	62 14 30	2711
	Pollux E.	109 4 18	2620	107 25 50	2635	105 47 42	2649	104 9 54	2663
23	SUN W.	39 53 22	3081	41 21 55	3096	42 50 9	3112	44 18 4	3127
	Aldebaran E.	54 16 22	2801	52 41 56	2821	51 7 55	2840	49 34 19	2859
	Pollux E.	96 5 51	2738	94 30 2	2753	92 54 33	2769	91 19 24	2783
24	SUN W.	51 33 5	3202	52 59 12	3217	54 25 1	3231	55 50 34	3244
	Aldebaran E.	41 52 41	2962	40 21 41	2985	38 51 10	3009	37 21 8	3034
	Pollux E.	83 28 22	2855	81 55 5	2868	80 22 5	2881	78 49 22	2895
25	SUN W.	62 54 23	3309	64 18 24	3320	65 42 12	3332	67 5 46	3344
	Aldebaran E.	29 58 58	3178	28 32 23	3215	27 6 32	3236	25 41 29	3253
	Pollux E.	71 9 58	2958	69 38 52	2969	68 8 1	2981	66 37 24	2991
	Regulus E.	108 4 5	2936	106 32 32	2946	105 1 12	2958	103 30 6	2967
26	SUN W.	74 0 33	3393	75 22 58	3401	76 45 13	3409	78 7 19	3416
	Pollux E.	59 7 35	3042	57 38 14	3051	56 9 4	3059	54 40 4	3068
	Regulus E.	95 57 35	3013	94 27 38	3020	92 57 50	3027	91 28 11	3034
27	SUN W.	84 55 56	3446	86 17 20	3450	87 38 40	3454	88 59 55	3458
	α Arietis W.	28 31 35	3121	29 59 19	3129	31 27 5	3138	32 54 53	3147
	Pollux E.	47 17 33	3105	45 49 29	3111	44 21 33	3117	42 53 44	3124
	Regulus E.	84 1 54	3062	82 32 58	3065	81 4 6	3069	79 35 19	3072
28	SUN W.	95 45 26	3466	97 6 28	3466	98 27 30	3466	99 48 32	3465
	α Arietis W.	40 14 16	3110	41 42 14	3107	43 10 15	3105	44 38 18	3102
	Pollux E.	35 36 32	3134	34 9 28	3160	32 42 31	3168	31 15 43	3174
	Regulus E.	72 12 7	3080	70 43 33	3081	69 15 0	3080	67 46 26	3079

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>'</sup> <sup>"</sup>	<sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Tues.	1	22 49 45.62	9.354	S. 7 27 25.8	+57.05	16 10.36	65.42	12 28.85	0.501
Wed.	2	22 53 29.86	9.333	7 4 33.4	57.30	16 10.12	65.35	12 16.55	0.522
Thur.	3	22 57 13.60	9.313	6 41 35.2	57.54	16 9.88	65.28	12 3.78	0.542
Frid.	4	23 0 56.86	9.293	6 18 31.4	+57.76	16 9.64	65.21	11 50.52	0.561
Sat.	5	23 4 39.66	9.274	5 55 22.6	57.97	16 9.39	65.15	11 36.80	0.580
SUN.	6	23 8 22.02	9.256	5 32 8.9	58.16	16 9.14	65.09	11 22.65	0.598
Mon.	7	23 12 3.96	9.240	5 8 50.8	+58.34	16 8.88	65.03	11 8.09	0.615
Tues.	8	23 15 45.52	9.224	4 45 28.7	58.50	16 8.62	64.97	10 53.11	0.631
Wed.	9	23 19 26.70	9.209	4 22 2.9	58.65	16 8.36	64.91	10 37.79	0.645
Thur.	10	23 23 7.55	9.195	3 58 33.7	+58.78	16 8.10	64.86	10 22.14	0.659
Frid.	11	23 26 48.07	9.182	3 35 1.5	58.90	16 7.84	64.82	10 6.14	0.672
Sat.	12	23 30 28.29	9.170	3 11 26.7	59.00	16 7.57	64.78	9 49.86	0.684
SUN.	13	23 34 8.24	9.159	2 47 49.6	+59.09	16 7.30	64.74	9 33.30	0.695
Mon.	14	23 37 47.94	9.149	2 24 10.5	59.16	16 7.03	64.70	9 16.48	0.705
Tues.	15	23 41 27.40	9.140	2 0 29.9	59.22	16 6.75	64.66	8 59.44	0.714
Wed.	16	23 45 6.65	9.132	1 36 48.2	+59.26	16 6.48	64.63	8 42.19	0.722
Thur.	17	23 48 45.72	9.124	1 13 5.6	59.28	16 6.20	64.60	8 24.76	0.730
Frid.	18	23 52 24.60	9.117	0 49 22.7	59.29	16 5.92	64.57	8 7.13	0.737
Sat.	19	23 56 3.34	9.111	0 25 39.7	+59.28	16 5.64	64.54	7 49.37	0.743
SUN.	20	23 59 41.94	9.106	S. 0 1 57.0	59.26	16 5.36	64.52	7 31.46	0.749
Mon.	21	0 3 20.43	9.102	N. 0 21 44.8	59.22	16 5.09	64.50	7 13.44	0.753
Tues.	22	0 6 58.81	9.098	0 45 25.6	+59.17	16 4.81	64.49	6 55.32	0.756
Wed.	23	0 10 37.12	9.096	1 9 4.8	59.10	16 4.54	64.48	6 37.13	0.759
Thur.	24	0 14 15.35	9.092	1 32 42.2	59.01	16 4.26	64.48	6 18.85	0.762
Frid.	25	0 17 53.53	9.090	1 56 17.2	+58.91	16 3.99	64.48	6 0.53	0.764
Sat.	26	0 21 31.68	9.089	2 19 49.6	58.79	16 3.72	64.48	5 42.19	0.765
SUN.	27	0 25 9.82	9.089	2 43 18.9	58.65	16 3.45	64.48	5 23.81	0.766
Mon.	28	0 28 47.95	9.089	3 6 44.8	+58.50	16 3.18	64.48	5 5.44	0.765
Tues.	29	0 32 26.11	9.091	3 30 7.0	58.34	16 2.91	64.49	4 47.10	0.763
Wed.	30	0 36 4.30	9.093	3 53 25.1	58.16	16 2.64	64.50	4 28.78	0.762
Thur.	31	0 39 42.55	9.096	4 16 38.8	57.97	16 2.37	64.51	4 10.54	0.760
Frid.	32	0 43 20.88	9.099	N. 4 39 47.7	+57.77	16 2.10	64.53	3 52.37	0.756

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations, increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Tues.	1	22 49 43.68	9.356	S. 7 27 37.7	+57.06	12 28.95	0.501	22 37 14.73
Wed.	2	22 53 27.95	9.334	7 4 45.2	57.31	12 16.66	0.522	22 41 11.29
Thur.	3	22 57 11.73	9.313	6 41 46.8	57.55	12 3.89	0.542	22 45 7.84
Frid.	4	23 0 55.02	9.294	6 18 42.9	+57.77	11 50.63	0.561	22 49 4.39
Sat.	5	23 4 37.86	9.275	5 55 33.8	57.98	11 36.91	0.580	22 53 0.95
SUN.	6	23 8 20.26	9.258	5 32 20.0	58.17	11 22.76	0.598	22 56 57.50
Mon.	7	23 12 2.25	9.242	5 9 1.7	+58.35	11 8.20	0.615	23 0 54.05
Tues.	8	23 15 43.84	9.226	4 45 39.4	58.51	10 53.23	0.631	23 4 50.61
Wed.	9	23 19 25.07	9.211	4 22 13.3	58.66	10 37.91	0.645	23 8 47.16
Thur.	10	23 23 5.96	9.197	3 58 43.9	+58.79	10 22.25	0.659	23 12 43.71
Frid.	11	23 26 46.52	9.184	3 35 11.5	58.91	10 6.25	0.672	23 16 40.27
Sat.	12	23 30 26.79	9.172	3 11 36.4	59.01	9 49.97	0.684	23 20 36.82
SUN.	13	23 34 6.78	9.161	2 47 59.0	+59.10	9 33.41	0.695	23 24 33.37
Mon.	14	23 37 46.52	9.151	2 24 19.7	59.17	9 16.59	0.705	23 28 29.93
Tues.	15	23 41 26.03	9.142	2 0 38.9	59.23	8 59.55	0.714	23 32 26.48
Wed.	16	23 45 5.33	9.133	1 36 56.8	+59.27	8 42.30	0.722	23 36 23.03
Thur.	17	23 48 44.44	9.126	1 13 14.0	59.29	8 24.86	0.730	23 40 19.58
Frid.	18	23 52 23.37	9.119	0 49 30.8	59.30	8 7.23	0.737	23 44 16.14
Sat.	19	23 56 2.16	9.113	0 25 47.4	+59.30	7 49.47	0.743	23 48 12.69
SUN.	20	23 59 40.80	9.108	S. 0 2 4.5	59.28	7 31.56	0.749	23 52 9.24
Mon.	21	0 3 19.33	9.104	N. 0 21 37.7	59.24	7 13.53	0.753	23 56 5.80
Tues.	22	0 6 57.76	9.100	0 45 18.7	+59.18	6 55.41	0.756	0 0 2.35
Wed.	23	0 10 36.11	9.097	1 8 58.3	59.11	6 37.21	0.759	0 3 58.90
Thur.	24	0 14 14.39	9.094	1 32 35.9	59.02	6 18.93	0.762	0 7 55.46
Frid.	25	0 17 52.62	9.092	1 56 11.3	+58.92	6 0.61	0.764	0 11 52.01
Sat.	26	0 21 30.82	9.091	2 19 44.0	58.80	5 42.26	0.765	0 15 48.56
SUN.	27	0 25 9.00	9.091	2 43 13.6	58.66	5 23.88	0.766	0 19 45.12
Mon.	28	0 28 47.18	9.091	3 6 39.9	+58.51	5 5.51	0.765	0 23 41.67
Tues.	29	0 32 25.38	9.092	3 30 2.4	58.35	4 47.16	0.763	0 27 38.22
Wed.	30	0 36 3.62	9.094	3 53 20.8	58.17	4 28.84	0.762	0 31 34.78
Thur.	31	0 39 41.92	9.097	4 16 34.8	57.98	4 10.59	0.760	0 35 31.33
Frid.	32	0 43 20.30	9.101	N. 4 39 44.0	+57.78	3 52.42	0.756	0 39 27.88

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that south declinations are decreasing; north declinations are increasing.

Diff. for 1 Hour,  
+ 9<sup>h</sup>.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	60	340 57 55.2	57 30.6	150.39	+ 0.33	9.9962425	+44.2	h m s 1 22 31.71
2	61	341 58 3.5	57 38.8	150.31	0.22	9.9963493	44.7	1 18 35.80
3	62	342 58 9.7	57 44.9	150.22	+ 0.09	9.9964574	45.3	1 14 39.90
4	63	343 58 13.8	57 48.9	150.13	— 0.06	9.9965668	+45.9	1 10 43.99
5	64	344 58 16.0	57 51.0	150.04	0.18	9.9966777	46.5	1 6 48.08
6	65	345 58 16.0	57 50.9	149.96	0.30	9.9967901	47.1	1 2 52.17
7	66	346 58 14.2	57 49.0	149.88	— 0.40	9.9969039	+47.7	0 58 56.26
8	67	347 58 10.4	57 45.1	149.80	0.49	9.9970192	48.3	0 55 0.36
9	68	348 58 4.7	57 39.2	149.72	0.54	9.9971360	48.9	0 51 4.45
10	69	349 57 57.2	57 31.6	149.65	— 0.57	9.9972542	+49.5	0 47 8.54
11	70	350 57 47.9	57 22.2	149.58	0.56	9.9973736	50.0	0 43 12.64
12	71	351 57 36.8	57 11.0	149.51	0.53	9.9974941	50.4	0 39 16.73
13	72	352 57 24.1	56 58.2	149.44	— 0.46	9.9976156	+50.8	0 35 20.82
14	73	353 57 9.7	56 43.7	149.37	0.37	9.9977381	51.2	0 31 24.91
15	74	354 56 53.5	56 27.4	149.29	0.26	9.9978612	51.5	0 27 29.01
16	75	355 56 35.7	56 9.5	149.22	— 0.15	9.9979851	+51.7	0 23 33.10
17	76	356 56 16.2	55 49.9	149.15	— 0.02	9.9981092	51.8	0 19 37.19
18	77	357 55 54.8	55 28.4	149.08	+ 0.12	9.9982335	51.8	0 15 41.28
19	78	358 55 31.7	55 5.2	149.00	+ 0.24	9.9983580	+51.8	0 11 45.38
20	79	359 55 6.8	54 40.2	148.92	0.35	9.9984823	51.8	0 7 49.47
21	80	0 54 39.9	54 13.2	148.84	0.44	9.9986067	51.8	0 3 53.56 23 59 57.66
22	81	1 54 11.1	53 44.3	148.76	+ 0.51	9.9987307	+51.7	23 56 1.75
23	82	2 53 40.4	53 13.5	148.67	0.55	9.9988544	51.6	23 52 5.84
24	83	3 53 7.4	52 40.4	148.58	0.55	9.9989778	51.4	23 48 9.93
25	84	4 52 32.4	52 5.3	148.49	+ 0.53	9.9991009	+51.2	23 44 14.02
26	85	5 51 55.1	51 27.9	148.40	0.47	9.9992237	51.1	23 40 18.12
27	86	6 51 15.5	50 48.2	148.31	0.40	9.9993462	51.0	23 36 22.21
28	87	7 50 33.7	50 6.3	148.21	+ 0.29	9.9994684	+50.9	23 32 26.30
29	88	8 49 49.6	49 22.1	148.11	0.17	9.9995906	50.9	23 28 30.40
30	89	9 49 3.0	48 35.4	148.01	+ 0.04	9.9997129	50.9	23 24 34.49
31	90	10 48 14.2	47 46.5	147.91	— 0.10	9.9998351	51.0	23 20 38.58
32	91	11 47 23.1	46 55.3	147.82	— 0.23	9.9999575	+51.1	23 16 42.68
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								
								Diff. for 1 Hour. —9 <sup>h</sup> .8296. (Table II.)



GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	14 48.5	14 49.2	54 14.0	+0.12	54 16.7	+0.33	7 2.0	2.10	8.7
2	14 50.7	14 52.8	54 22.0	0.54	54 29.7	0.73	7 52.2	2.08	9.7
3	14 55.5	14 58.7	54 39.6	0.91	54 51.6	1.08	8 41.5	2.03	10.7
4	15 2.5	15 6.7	55 5.4	+1.22	55 20.8	+1.34	9 29.4	1.97	11.7
5	15 11.2	15 16.0	55 37.5	1.43	55 55.2	1.50	10 16.0	1.92	12.7
6	15 21.0	15 26.1	56 13.6	1.55	56 32.3	1.56	11 1.6	1.89	13.7
7	15 31.3	15 36.3	56 51.1	+1.55	57 9.5	+1.52	11 46.8	1.89	14.7
8	15 41.2	15 45.7	57 27.4	1.45	57 44.3	1.36	12 32.5	1.93	15.7
9	15 50.0	15 54.0	58 0.1	1.27	58 14.6	1.15	13 19.8	2.01	16.7
10	15 57.5	16 0.6	58 27.6	+1.01	58 39.0	+0.88	14 9.5	2.14	17.7
11	16 3.3	16 5.5	58 48.8	0.75	58 57.0	0.61	15 2.6	2.29	18.7
12	16 7.3	16 8.7	59 3.5	0.48	59 8.5	0.36	15 59.3	2.44	19.7
13	16 9.6	16 10.2	59 12.1	+0.24	59 14.3	+0.13	16 59.2	2.54	20.7
14	16 10.5	16 10.4	59 15.2	+0.03	59 14.9	-0.07	18 0.6	2.56	21.7
15	16 10.0	16 9.3	59 13.5	-0.17	59 10.9	0.26	19 1.4	2.49	22.7
16	16 8.3	16 7.0	59 7.3	-0.35	59 2.5	-0.45	19 59.8	2.36	23.7
17	16 5.4	16 3.5	58 56.6	0.55	58 49.4	0.65	20 54.6	2.21	24.7
18	16 1.2	15 58.6	58 41.0	0.75	58 31.4	0.85	21 45.9	2.07	25.7
19	15 55.6	15 52.3	58 20.5	-0.96	58 8.3	-1.07	22 34.2	1.96	26.7
20	15 48.6	15 44.7	57 54.9	1.16	57 40.4	1.25	23 20.5	1.90	27.7
21	15 40.5	15 36.0	57 24.9	1.33	57 8.6	1.39	δ		28.7
22	15 31.4	15 26.7	56 51.6	-1.43	56 34.2	-1.46	0 5.9	1.88	0.1
23	15 21.9	15 17.1	56 16.6	1.46	55 59.2	1.43	0 51.2	1.90	1.1
24	15 12.5	15 8.1	55 42.2	1.38	55 26.0	1.31	1 37.3	1.94	2.1
25	15 3.9	15 0.2	55 10.8	-1.21	54 56.9	-1.10	2 24.6	2.00	3.1
26	14 56.8	14 53.9	54 44.5	0.96	54 33.9	0.80	3 13.3	2.06	4.1
27	14 51.6	14 49.8	54 25.3	0.63	54 18.9	0.43	4 3.1	2.09	5.1
28	14 48.7	14 48.3	54 14.9	-0.23	54 13.3	-0.03	4 53.5	2.10	6.1
29	14 48.5	14 49.5	54 14.2	+0.19	54 17.8	+0.41	5 43.6	2.08	7.1
30	14 51.2	14 53.6	54 24.0	0.63	54 32.8	0.83	6 32.9	2.03	8.1
31	14 56.7	15 0.4	54 44.1	1.04	54 57.8	1.24	7 20.8	1.97	9.1
32	15 4.7	15 9.6	55 13.7	+1.41	55 31.7	+1.58	8 7.3	1.91	10.1

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 1.					THURSDAY 3.				
0	h m s		N. 26 5 29.4	0.424	0	h m s		N. 23 23 49.8	6.220
1	5 27 10.64	2.1961	26 5 0.2	0.549	1	7 11 38.04	2.1407	23 17 33.2	6.333
2	5 29 22.40	2.1959	26 4 23.5	0.673	2	7 13 46.42	2.1386	23 11 9.8	6.446
3	5 31 34.15	2.1958	26 3 39.4	0.798	3	7 15 54.67	2.1365	23 4 39.7	6.557
4	5 33 45.90	2.1957	26 2 47.8	0.922	4	7 18 2.80	2.1345	22 58 2.9	6.669
5	5 35 57.63	2.1953	26 1 48.7	1.047	5	7 20 10.81	2.1324	22 51 19.4	6.780
6	5 38 9.34	2.1950	26 0 42.1	1.172	6	7 22 18.69	2.1303	22 44 29.3	6.891
7	5 40 21.03	2.1947	25 59 28.0	1.297	7	7 24 26.45	2.1283	22 37 32.5	7.002
8	5 42 32.70	2.1943	25 58 6.5	1.421	8	7 26 34.09	2.1262	22 30 29.1	7.112
9	5 44 44.34	2.1938	25 56 37.5	1.545	9	7 28 41.59	2.1239	22 23 19.1	7.221
10	5 46 55.96	2.1933	25 55 1.1	1.668	10	7 30 48.96	2.1218	22 16 2.6	7.329
11	5 49 7.54	2.1928	25 53 17.3	1.793	11	7 32 56.21	2.1197	22 8 39.6	7.438
12	5 51 19.09	2.1922	25 51 26.0	1.917	12	7 35 3.32	2.1174	22 1 10.1	7.545
13	5 53 30.61	2.1916	25 49 27.3	2.040	13	7 37 10.30	2.1152	21 53 34.2	7.652
14	5 55 42.08	2.1908	25 47 21.2	2.164	14	7 39 17.15	2.1131	21 45 51.8	7.759
15	5 57 53.51	2.1902	25 45 7.6	2.288	15	7 41 23.87	2.1109	21 38 3.1	7.864
16	6 0 4.90	2.1893	25 42 46.6	2.411	16	7 43 30.46	2.1087	21 30 8.1	7.970
17	6 2 16.23	2.1884	25 40 18.3	2.534	17	7 45 36.91	2.1064	21 22 6.7	8.076
18	6 4 27.51	2.1876	25 37 42.5	2.657	18	7 47 43.23	2.1042	21 13 59.0	8.180
19	6 6 38.74	2.1867	25 34 59.4	2.780	19	7 49 49.41	2.1019	21 5 45.1	8.283
20	6 8 49.91	2.1857	25 32 8.9	2.902	20	7 51 55.46	2.0997	20 57 25.0	8.387
21	6 11 1.02	2.1847	25 29 11.1	3.025	21	7 54 1.38	2.0975	20 48 58.7	8.489
22	6 13 12.07	2.1836	25 26 5.9	3.147	22	7 56 7.16	2.0952	20 40 26.3	8.591
23	6 15 23.05	2.1825	N. 25 22 53.4	3.269	23	7 58 12.81	2.0930	N. 20 31 47.8	8.692
WEDNESDAY 2.					FRIDAY 4.				
0	6 17 33.97	2.1814	N. 25 19 33.6	3.391	0	8 0 18.32	2.0907	N. 20 23 3.3	8.793
1	6 19 44.82	2.1808	25 16 6.5	3.512	1	8 2 23.70	2.0885	20 14 12.7	8.893
2	6 21 55.59	2.1799	25 12 32.1	3.634	2	8 4 28.94	2.0862	20 5 16.1	8.992
3	6 24 6.29	2.1777	25 8 50.4	3.755	3	8 6 34.05	2.0840	19 56 13.6	9.091
4	6 26 16.91	2.1763	25 5 1.5	3.875	4	8 8 39.02	2.0817	19 47 5.2	9.189
5	6 28 27.45	2.1749	25 1 5.4	3.996	5	8 10 43.86	2.0796	19 37 50.9	9.287
6	6 30 37.90	2.1735	24 57 2.0	4.117	6	8 12 48.57	2.0774	19 28 30.7	9.385
7	6 32 48.27	2.1722	24 52 51.4	4.236	7	8 14 53.15	2.0752	19 19 4.7	9.481
8	6 34 58.56	2.1707	24 48 33.7	4.355	8	8 16 57.59	2.0729	19 9 33.0	9.576
9	6 37 8.75	2.1691	24 44 8.8	4.475	9	8 19 1.90	2.0708	18 59 55.6	9.671
10	6 39 18.85	2.1676	24 39 36.7	4.594	10	8 21 6.08	2.0686	18 50 12.5	9.766
11	6 41 28.86	2.1660	24 34 57.5	4.712	11	8 23 10.13	2.0664	18 40 23.7	9.859
12	6 43 38.77	2.1643	24 30 11.3	4.830	12	8 25 14.05	2.0642	18 30 29.4	9.952
13	6 45 48.58	2.1628	24 25 17.9	4.948	13	8 27 17.84	2.0621	18 20 29.5	10.044
14	6 47 58.30	2.1611	24 20 17.5	5.065	14	8 29 21.50	2.0600	18 10 24.1	10.136
15	6 50 7.91	2.1593	24 15 10.1	5.182	15	8 31 25.04	2.0579	18 0 13.2	10.227
16	6 52 17.42	2.1576	24 9 55.6	5.300	16	8 33 28.45	2.0557	17 49 56.9	10.317
17	6 54 26.82	2.1558	24 4 34.1	5.417	17	8 35 31.73	2.0537	17 39 35.2	10.406
18	6 56 36.12	2.1541	23 59 5.6	5.532	18	8 37 34.89	2.0517	17 29 8.2	10.494
19	6 58 45.31	2.1522	23 53 30.2	5.647	19	8 39 37.93	2.0496	17 18 35.9	10.582
20	7 0 54.39	2.1503	23 47 47.9	5.763	20	8 41 40.84	2.0475	17 7 58.3	10.670
21	7 3 3.35	2.1484	23 41 58.6	5.878	21	8 43 43.63	2.0456	16 57 15.5	10.756
22	7 5 12.20	2.1465	23 36 2.5	5.992	22	8 45 46.31	2.0437	16 46 27.6	10.842
23	7 7 20.93	2.1445	23 29 59.6	6.106	23	8 47 48.87	2.0417	16 35 34.5	10.927
24	7 9 29.54	2.1426	N. 23 23 49.8	6.220	24	8 49 51.31	2.0397	N. 16 24 36.4	11.011

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 5.					MONDAY 7.				
0	h m s	s	N. 16 24 36.4	11.011	0	h m s	s	N. 6 14 39.4	14.099
1	8 49 51.31	2.0397	16 13 33.2	11.095	1	10 26 10.56	1.9900	6 0 34.6	14.100
2	8 51 53.63	2.0377	16 2 25.0	11.177	2	10 28 9.96	1.9902	5 46 27.4	14.199
3	8 53 55.84	2.0359	15 51 11.9	11.259	3	10 30 9.38	1.9903	5 32 17.9	14.177
4	8 55 57.94	2.0341	15 39 53.9	11.341	4	10 32 8.80	1.9905	5 18 6.1	14.215
5	8 57 59.93	2.0322	15 28 31.0	11.422	5	10 34 8.24	1.9908	5 3 52.1	14.251
6	9 0 1.81	2.0304	15 17 3.3	11.501	6	10 36 7.70	1.9912	4 49 36.0	14.286
7	9 2 3.58	2.0287	15 5 30.9	11.579	7	10 38 7.18	1.9917	4 35 17.8	14.320
8	9 4 5.25	2.0269	14 53 53.8	11.657	8	10 40 6.70	1.9922	4 20 57.6	14.353
9	9 6 6.81	2.0253	14 42 12.1	11.734	9	10 42 6.24	1.9927	4 6 35.4	14.385
10	9 8 8.28	2.0236	14 30 25.7	11.812	10	10 44 5.82	1.9932	3 52 11.4	14.416
11	9 10 9.64	2.0218	14 18 34.7	11.887	11	10 46 5.43	1.9938	3 37 45.5	14.446
12	9 12 10.90	2.0202	14 6 39.3	11.961	12	10 48 5.08	1.9946	3 23 17.9	14.474
13	9 14 12.07	2.0187	13 54 39.4	12.035	13	10 50 4.78	1.9954	3 8 48.6	14.502
14	9 16 13.14	2.0172	13 42 35.1	12.108	14	10 52 4.53	1.9963	2 54 17.7	14.528
15	9 18 14.13	2.0157	13 30 26.4	12.181	15	10 54 4.33	1.9971	2 39 45.3	14.553
16	9 20 15.02	2.0141	13 18 13.4	12.252	16	10 56 4.18	1.9980	2 25 11.4	14.578
17	9 22 15.82	2.0127	13 5 56.1	12.323	17	10 58 4.09	1.9991	2 10 36.0	14.601
18	9 24 16.54	2.0113	12 53 34.6	12.393	18	11 0 4.07	2.0002	1 55 59.3	14.622
19	9 26 17.18	2.0099	12 41 8.9	12.462	19	11 2 4.11	2.0013	1 41 21.4	14.642
20	9 28 17.73	2.0086	12 28 39.1	12.530	20	11 4 4.23	2.0026	1 26 42.3	14.660
21	9 30 18.21	2.0073	12 16 5.3	12.597	21	11 6 4.42	2.0038	1 12 2.0	14.681
22	9 32 18.61	2.0061	12 3 27.5	12.663	22	11 8 4.69	2.0052	0 57 20.6	14.698
23	9 34 18.94	2.0049	N. 11 50 45.7	12.728	23	11 10 5.04	2.0065	N. 0 42 38.3	14.713
24	9 36 19.20	2.0037				11 12 5.47	2.0080		
SUNDAY 6.					TUESDAY 8.				
0	9 38 19.38	2.0025	N. 11 38 0.1	12.793	0	11 14 6.00	2.0096	N. 0 27 55.0	14.728
1	9 40 19.50	2.0015	11 25 10.6	12.857	1	11 16 6.62	2.0112	N. 0 13 10.9	14.742
2	9 42 19.56	2.0004	11 12 17.3	12.919	2	11 18 7.34	2.0128	S. 0 1 34.0	14.754
3	9 44 19.55	1.9994	10 59 20.3	12.981	3	11 20 8.16	2.0145	0 16 19.6	14.765
4	9 46 19.49	1.9986	10 46 19.6	13.042	4	11 22 9.08	2.0162	0 31 5.8	14.775
5	9 48 19.38	1.9977	10 33 15.3	13.102	5	11 24 10.11	2.0181	0 45 52.6	14.783
6	9 50 19.21	1.9968	10 20 7.4	13.161	6	11 26 11.25	2.0200	1 0 39.8	14.791
7	9 52 18.99	1.9960	10 6 56.0	13.219	7	11 28 12.51	2.0220	1 15 27.5	14.797
8	9 54 18.73	1.9952	9 53 41.1	13.277	8	11 30 13.89	2.0240	1 30 15.5	14.803
9	9 56 18.42	1.9945	9 40 22.8	13.333	9	11 32 15.39	2.0261	1 45 3.8	14.807
10	9 58 18.07	1.9938	9 27 1.2	13.388	10	11 34 17.02	2.0283	1 59 52.3	14.809
11	10 0 17.68	1.9932	9 13 36.3	13.442	11	11 36 18.78	2.0305	2 14 40.9	14.810
12	10 2 17.26	1.9927	9 0 8.2	13.495	12	11 38 20.68	2.0328	2 29 29.5	14.810
13	10 4 16.81	1.9922	8 46 36.9	13.548	13	11 40 22.72	2.0352	2 44 18.1	14.808
14	10 6 16.32	1.9917	8 33 2.4	13.600	14	11 42 24.90	2.0377	2 59 6.5	14.805
15	10 8 15.81	1.9912	8 19 24.9	13.650	15	11 44 27.24	2.0402	3 13 54.7	14.802
16	10 10 15.27	1.9909	8 5 44.4	13.700	16	11 46 29.72	2.0427	3 28 42.7	14.797
17	10 12 14.72	1.9907	7 52 0.9	13.748	17	11 48 32.36	2.0453	3 43 30.3	14.790
18	10 14 14.15	1.9903	7 38 14.6	13.796	18	11 50 35.16	2.0481	3 58 17.5	14.782
19	10 16 13.56	1.9902	7 24 25.4	13.842	19	11 52 38.13	2.0508	4 13 4.2	14.773
20	10 18 12.97	1.9901	7 10 33.5	13.887	20	11 54 41.26	2.0536	4 27 50.3	14.763
21	10 20 12.37	1.9900	6 56 38.9	13.933	21	11 56 44.56	2.0565	4 42 35.8	14.752
22	10 22 11.77	1.9899	6 42 41.6	13.977	22	11 58 48.04	2.0595	4 57 20.5	14.738
23	10 24 11.16	1.9899	6 28 41.7	14.018	23	12 0 51.70	2.0626	5 12 4.3	14.723
24	10 26 10.56	1.9900	N. 6 14 39.4	14.059	24	12 2 55.55	2.0657	S. 5 26 47.3	14.708

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 9.					FRIDAY 11.				
0	12 2 55.55	2.0657	S. 5 26 47.3	14.708	0	13 46 46.90	2.2820	S. 16 27 6.0	12.227
1	12 4 59.58	2.0688	5 41 29.2	14.690	1	13 49 3.99	2.2877	16 39 17.0	12.136
2	12 7 3.80	2.0720	5 56 10.1	14.672	2	13 51 21.42	2.2933	16 51 22.6	12.047
3	12 9 8.22	2.0753	6 10 49.8	14.652	3	13 53 39.19	2.2990	17 3 22.6	11.954
4	12 11 12.84	2.0787	6 25 28.3	14.630	4	13 55 57.30	2.3047	17 15 17.1	11.860
5	12 13 17.66	2.0820	6 40 5.4	14.607	5	13 58 15.75	2.3103	17 27 5.8	11.764
6	12 15 22.68	2.0854	6 54 41.1	14.582	6	14 0 34.54	2.3160	17 38 48.8	11.667
7	12 17 27.91	2.0890	7 9 15.3	14.557	7	14 2 53.67	2.3218	17 50 25.9	11.568
8	12 19 33.36	2.0927	7 23 48.0	14.531	8	14 5 13.15	2.3275	18 1 57.0	11.467
9	12 21 39.03	2.0963	7 38 19.0	14.503	9	14 7 32.97	2.3333	18 13 22.0	11.366
10	12 23 44.92	2.1000	7 52 48.3	14.473	10	14 9 53.14	2.3390	18 24 40.9	11.263
11	12 25 51.03	2.1037	8 7 15.7	14.441	11	14 12 13.65	2.3448	18 35 53.5	11.157
12	12 27 57.37	2.1076	8 21 41.2	14.408	12	14 14 34.51	2.3506	18 46 59.7	11.050
13	12 30 3.94	2.1115	8 36 4.7	14.374	13	14 16 55.72	2.3563	18 57 59.5	10.942
14	12 32 10.75	2.1155	8 50 26.1	14.338	14	14 19 17.27	2.3621	19 8 52.7	10.832
15	12 34 17.80	2.1196	9 4 45.3	14.301	15	14 21 39.17	2.3679	19 19 39.3	10.721
16	12 36 25.10	2.1237	9 19 2.2	14.262	16	14 24 1.42	2.3737	19 30 19.2	10.608
17	12 38 32.64	2.1278	9 33 16.8	14.223	17	14 26 24.01	2.3794	19 40 52.3	10.493
18	12 40 40.44	2.1321	9 47 28.9	14.181	18	14 28 46.95	2.3852	19 51 18.4	10.377
19	12 42 48.49	2.1365	10 1 38.5	14.138	19	14 31 10.24	2.3910	20 1 37.5	10.259
20	12 44 56.79	2.1406	10 15 45.5	14.093	20	14 33 33.87	2.3967	20 11 49.5	10.141
21	12 47 5.36	2.1450	10 29 49.7	14.047	21	14 35 57.85	2.4025	20 21 54.4	10.021
22	12 49 14.19	2.1494	10 43 51.2	14.001	22	14 38 22.17	2.4082	20 31 52.0	9.898
23	12 51 23.29	2.1539	S. 10 57 49.8	13.958	23	14 40 46.83	2.4138	S. 20 41 42.2	9.774
THURSDAY 10.					SATURDAY 12.				
0	12 53 32.66	2.1583	S. 11 11 45.4	13.901	0	14 43 11.82	2.4194	S. 20 51 24.9	9.649
1	12 55 42.31	2.1631	11 25 37.9	13.849	1	14 45 37.16	2.4252	21 1 0.1	9.523
2	12 57 52.23	2.1677	11 39 27.3	13.796	2	14 48 2.84	2.4308	21 10 27.7	9.395
3	13 0 2.44	2.1725	11 53 13.4	13.741	3	14 50 28.86	2.4364	21 19 47.5	9.265
4	13 2 12.93	2.1772	12 6 56.2	13.684	4	14 52 55.21	2.4419	21 28 59.5	9.134
5	13 4 23.71	2.1821	12 20 35.5	13.626	5	14 55 21.89	2.4475	21 38 3.6	9.002
6	13 6 34.78	2.1870	12 34 11.3	13.566	6	14 57 48.91	2.4530	21 46 59.8	8.869
7	13 8 46.15	2.1919	12 47 43.4	13.505	7	15 0 16.25	2.4584	21 55 47.9	8.733
8	13 10 57.81	2.1968	13 1 11.9	13.443	8	15 2 43.92	2.4638	22 4 27.8	8.597
9	13 13 9.77	2.2019	13 14 36.6	13.378	9	15 5 11.91	2.4692	22 12 59.5	8.458
10	13 15 22.04	2.2070	13 27 57.3	13.312	10	15 7 40.22	2.4745	22 21 22.8	8.319
11	13 17 34.61	2.2120	13 41 14.1	13.244	11	15 10 8.85	2.4797	22 29 37.8	8.179
12	13 19 47.48	2.2172	13 54 26.8	13.177	12	15 12 37.79	2.4849	22 37 44.3	8.037
13	13 22 0.67	2.2224	14 7 35.3	13.106	13	15 15 7.04	2.4901	22 45 42.2	7.893
14	13 24 14.17	2.2276	14 20 39.5	13.034	14	15 17 36.60	2.4952	22 53 31.5	7.749
15	13 26 27.98	2.2329	14 33 39.4	12.961	15	15 20 6.47	2.5002	23 1 12.1	7.603
16	13 28 42.12	2.2382	14 46 34.8	12.885	16	15 22 36.63	2.5052	23 8 43.9	7.456
17	13 30 56.57	2.2436	14 59 25.6	12.808	17	15 25 7.09	2.5102	23 16 6.8	7.307
18	13 33 11.35	2.2490	15 12 11.8	12.730	18	15 27 37.85	2.5150	23 23 20.7	7.157
19	13 35 26.45	2.2544	15 24 53.2	12.650	19	15 30 8.89	2.5197	23 30 25.7	7.007
20	13 37 41.88	2.2599	15 37 29.8	12.569	20	15 32 40.21	2.5244	23 37 21.6	6.855
21	13 39 57.64	2.2654	15 50 1.5	12.487	21	15 35 11.82	2.5291	23 44 8.3	6.702
22	13 42 13.73	2.2709	16 2 28.2	12.402	22	15 37 43.70	2.5336	23 50 45.8	6.548
23	13 44 30.15	2.2764	16 14 49.7	12.315	23	15 40 15.85	2.5380	23 57 14.0	6.392
24	13 46 46.90	2.2820	S. 16 27 6.0	12.227	24	15 42 48.26	2.5423	S. 24 3 32.8	6.235

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 13.					TUESDAY 15.				
0	15 42 48.26	2.5423	S. 24 3 32.8	6.235	0	17 47 44.61	2.6138	S. 25 47 56.3	2.032
1	15 45 20.93	2.5467	24 9 42.2	6.077	1	17 50 21.39	2.6120	25 45 49.1	2.207
2	15 47 53.86	2.5508	24 15 42.1	5.919	2	17 52 58.05	2.6101	25 43 31.5	2.381
3	15 50 27.03	2.5549	24 21 32.5	5.759	3	17 55 34.60	2.6081	25 41 3.4	2.555
4	15 53 0.45	2.5589	24 27 13.2	5.598	4	17 58 11.02	2.6058	25 38 24.9	2.728
5	15 55 34.10	2.5628	24 32 44.3	5.437	5	18 0 47.30	2.6035	25 35 36.0	2.901
6	15 58 7.99	2.5667	24 38 5.6	5.273	6	18 3 23.44	2.6011	25 32 36.8	3.072
7	16 0 42.10	2.5703	24 43 17.1	5.110	7	18 5 59.43	2.5986	25 29 27.3	3.244
8	16 3 16.42	2.5738	24 48 18.8	4.946	8	18 8 35.27	2.5959	25 26 7.5	3.416
9	16 5 50.96	2.5774	24 53 10.6	4.781	9	18 11 10.94	2.5931	25 22 37.4	3.587
10	16 8 25.71	2.5808	24 57 52.5	4.614	10	18 13 46.44	2.5902	25 18 57.1	3.756
11	16 11 0.65	2.5840	25 2 24.3	4.447	11	18 16 21.76	2.5872	25 15 6.7	3.924
12	16 13 35.79	2.5872	25 6 46.1	4.279	12	18 18 56.90	2.5840	25 11 6.2	4.092
13	16 16 11.12	2.5902	25 10 57.8	4.110	13	18 21 31.84	2.5807	25 6 55.6	4.260
14	16 18 46.62	2.5931	25 14 59.3	3.941	14	18 24 6.58	2.5773	25 2 35.0	4.427
15	16 21 22.29	2.5959	25 18 50.7	3.771	15	18 26 41.12	2.5738	24 58 4.4	4.592
16	16 23 58.13	2.5986	25 22 31.8	3.599	16	18 29 15.44	2.5702	24 53 23.9	4.757
17	16 26 34.12	2.6012	25 26 2.6	3.428	17	18 31 49.54	2.5665	24 48 33.6	4.921
18	16 29 10.27	2.6037	25 29 23.2	3.257	18	18 34 23.42	2.5627	24 43 33.4	5.084
19	16 31 46.56	2.6059	25 32 33.4	3.083	19	18 36 57.07	2.5588	24 38 23.5	5.246
20	16 34 22.98	2.6081	25 35 33.2	2.910	20	18 39 30.48	2.5548	24 33 3.9	5.407
21	16 36 59.53	2.6102	25 38 22.6	2.736	21	18 42 3.65	2.5507	24 27 34.7	5.567
22	16 39 36.20	2.6121	25 41 1.5	2.562	22	18 44 36.57	2.5465	24 21 55.9	5.727
23	16 42 12.98	2.6138	S. 25 43 30.0	2.387	23	18 47 9.23	2.5422	S. 24 16 7.5	5.884
MONDAY 14.					WEDNESDAY 16.				
0	16 44 49.86	2.6155	S. 25 45 48.0	2.212	0	18 49 41.64	2.5379	S. 24 10 9.8	6.040
1	16 47 26.84	2.6171	25 47 55.5	2.037	1	18 52 13.78	2.5334	24 4 2.7	6.197
2	16 50 3.91	2.6184	25 49 52.4	1.860	2	18 54 45.65	2.5289	23 57 46.2	6.352
3	16 52 41.05	2.6197	25 51 38.7	1.683	3	18 57 17.25	2.5243	23 51 20.5	6.505
4	16 55 18.27	2.6208	25 53 14.4	1.507	4	18 59 48.57	2.5197	23 44 45.6	6.658
5	16 57 55.55	2.6217	25 54 39.6	1.331	5	19 2 19.61	2.5148	23 38 1.6	6.809
6	17 0 32.88	2.6226	25 55 54.1	1.153	6	19 4 50.35	2.5100	23 31 8.5	6.959
7	17 3 10.26	2.6233	25 56 58.0	0.977	7	19 7 20.81	2.5052	23 24 6.5	7.107
8	17 5 47.68	2.6239	25 57 51.3	0.799	8	19 9 50.97	2.5002	23 16 55.6	7.255
9	17 8 25.13	2.6243	25 58 33.9	0.622	9	19 12 20.83	2.4951	23 9 35.9	7.402
10	17 11 2.59	2.6245	25 59 5.9	0.444	10	19 14 50.38	2.4900	23 2 7.4	7.547
11	17 13 40.07	2.6247	25 59 27.2	0.266	11	19 17 19.63	2.4849	22 54 30.2	7.692
12	17 16 17.55	2.6247	25 59 37.8	-0.088	12	19 19 48.57	2.4797	22 46 44.4	7.834
13	17 18 55.03	2.6246	25 59 37.8	+0.089	13	19 22 17.19	2.4744	22 38 50.1	7.975
14	17 21 32.50	2.6242	25 59 27.1	0.267	14	19 24 45.50	2.4691	22 30 47.4	8.115
15	17 24 9.94	2.6237	25 59 5.8	0.444	15	19 27 13.48	2.4637	22 22 36.3	8.255
16	17 26 47.35	2.6232	25 58 33.8	0.622	16	19 29 41.14	2.4582	22 14 17.0	8.390
17	17 29 24.73	2.6226	25 57 51.2	0.798	17	19 32 8.47	2.4528	22 5 49.5	8.527
18	17 32 2.06	2.6217	25 56 58.0	0.976	18	19 34 35.48	2.4474	21 57 13.8	8.662
19	17 34 39.33	2.6208	25 55 54.1	1.152	19	19 37 2.16	2.4418	21 48 30.1	8.794
20	17 37 16.55	2.6197	25 54 39.7	1.328	20	19 39 28.50	2.4362	21 39 38.5	8.926
21	17 39 53.69	2.6183	25 53 14.7	1.505	21	19 41 54.51	2.4307	21 30 39.0	9.057
22	17 42 30.75	2.6170	25 51 39.1	1.681	22	19 44 20.18	2.4250	21 21 31.7	9.185
23	17 45 7.73	2.6155	25 49 53.0	1.857	23	19 46 45.51	2.4193	21 12 16.8	9.312
24	17 47 44.61	2.6138	S. 25 47 56.3	2.032	24	19 49 10.50	2.4137	S. 21 2 54.2	9.439

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 17.					SATURDAY 19.				
0	19 49 10.50	2.4137	S. 21 2 54.2	9.439	0	21 38 33.42	2.1537	S. 11 33 14.7	13.712
1	19 51 35.15	2.4080	20 53 24.1	9.563	1	21 40 42.51	2.1492	11 19 30.4	13.764
2	19 53 59.46	2.4023	20 43 46.6	9.687	2	21 42 51.33	2.1448	11 5 43.0	13.814
3	19 56 23.43	2.3966	20 34 1.7	9.808	3	21 44 59.88	2.1403	10 51 52.7	13.863
4	19 58 47.05	2.3908	20 24 9.6	9.928	4	21 47 8.17	2.1361	10 37 59.5	13.911
5	20 1 10.33	2.3851	20 14 10.3	10.047	5	21 49 16.21	2.1318	10 24 3.4	13.958
6	20 3 33.26	2.3793	20 4 4.0	10.163	6	21 51 23.99	2.1276	10 10 4.6	14.002
7	20 5 55.85	2.3736	19 53 50.7	10.280	7	21 53 31.52	2.1234	9 56 3.2	14.045
8	20 8 18.09	2.3678	19 43 30.4	10.394	8	21 55 38.80	2.1193	9 41 59.2	14.087
9	20 10 39.98	2.3619	19 33 3.4	10.507	9	21 57 45.84	2.1152	9 27 52.7	14.127
10	20 13 1.52	2.3562	19 22 29.6	10.618	10	21 59 52.63	2.1112	9 13 43.9	14.167
11	20 15 22.72	2.3503	19 11 49.2	10.728	11	22 1 59.19	2.1074	8 59 32.7	14.205
12	20 17 43.56	2.3445	19 1 2.2	10.836	12	22 4 5.52	2.1036	8 45 19.3	14.241
13	20 20 4.06	2.3388	18 50 8.9	10.942	13	22 6 11.62	2.0998	8 31 3.8	14.275
14	20 22 24.21	2.3330	18 39 9.2	11.047	14	22 8 17.50	2.0961	8 16 46.3	14.308
15	20 24 44.02	2.3273	18 28 3.2	11.151	15	22 10 23.15	2.0923	8 2 26.8	14.341
16	20 27 3.49	2.3216	18 16 51.1	11.253	16	22 12 28.58	2.0887	7 48 5.4	14.372
17	20 29 22.61	2.3158	18 5 32.9	11.353	17	22 14 33.80	2.0852	7 33 42.2	14.401
18	20 31 41.39	2.3101	17 54 8.7	11.452	18	22 16 38.81	2.0818	7 19 17.3	14.428
19	20 33 59.82	2.3043	17 42 38.6	11.550	19	22 18 43.62	2.0784	7 4 50.8	14.455
20	20 36 17.91	2.2987	17 31 2.7	11.646	20	22 20 48.22	2.0750	6 50 22.7	14.481
21	20 38 35.66	2.2930	17 19 21.1	11.740	21	22 22 52.62	2.0717	6 35 53.1	14.505
22	20 40 53.07	2.2874	17 7 33.9	11.833	22	22 24 56.83	2.0686	6 21 22.1	14.527
23	20 43 10.15	2.2818	S. 16 55 41.1	11.925	23	22 27 0.85	2.0654	S. 6 6 49.9	14.547
FRIDAY 18.					SUNDAY 20.				
0	20 45 26.89	2.2763	S. 16 43 42.9	12.014	0	22 29 4.68	2.0623	S. 5 52 16.5	14.567
1	20 47 43.30	2.2707	16 31 39.4	12.102	1	22 31 8.33	2.0593	5 37 41.9	14.585
2	20 49 59.37	2.2651	16 19 30.6	12.189	2	22 33 11.80	2.0563	5 23 6.3	14.602
3	20 52 15.11	2.2596	16 7 16.7	12.274	3	22 35 15.09	2.0534	5 8 29.7	14.617
4	20 54 30.52	2.2542	15 54 57.7	12.357	4	22 37 18.21	2.0507	4 53 52.2	14.632
5	20 56 45.61	2.2487	15 42 33.8	12.440	5	22 39 21.17	2.0479	4 39 13.8	14.646
6	20 59 0.37	2.2433	15 30 4.9	12.522	6	22 41 23.96	2.0452	4 24 34.7	14.657
7	21 1 14.81	2.2380	15 17 31.2	12.600	7	22 43 26.59	2.0426	4 9 54.9	14.667
8	21 3 28.93	2.2327	15 4 52.9	12.677	8	22 45 29.07	2.0401	3 55 14.6	14.677
9	21 5 42.74	2.2275	14 52 9.9	12.754	9	22 47 31.40	2.0375	3 40 33.7	14.685
10	21 7 56.23	2.2222	14 39 22.4	12.828	10	22 49 33.57	2.0350	3 25 52.4	14.692
11	21 10 9.40	2.2169	14 26 30.5	12.901	11	22 51 35.60	2.0327	3 11 10.7	14.697
12	21 12 22.26	2.2118	14 13 34.3	12.972	12	22 53 37.50	2.0305	2 56 28.7	14.702
13	21 14 34.82	2.2067	14 0 33.8	13.042	13	22 55 39.26	2.0282	2 41 46.5	14.704
14	21 16 47.07	2.2016	13 47 29.2	13.111	14	22 57 40.89	2.0261	2 27 4.2	14.705
15	21 18 59.01	2.1966	13 34 20.5	13.177	15	22 59 42.39	2.0239	2 12 21.9	14.705
16	21 21 10.66	2.1917	13 21 7.9	13.243	16	23 1 43.76	2.0219	1 57 39.6	14.704
17	21 23 22.01	2.1867	13 7 51.4	13.307	17	23 3 45.02	2.0200	1 42 57.4	14.702
18	21 25 33.07	2.1819	12 54 31.1	13.369	18	23 5 46.16	2.0181	1 28 15.3	14.700
19	21 27 43.84	2.1771	12 41 7.1	13.430	19	23 7 47.19	2.0162	1 13 33.4	14.695
20	21 29 54.32	2.1723	12 27 39.5	13.490	20	23 9 48.11	2.0144	0 58 51.9	14.688
21	21 32 4.51	2.1675	12 14 8.3	13.548	21	23 11 48.92	2.0127	0 44 10.8	14.682
22	21 34 14.42	2.1629	12 0 33.7	13.604	22	23 13 49.63	2.0111	0 29 30.1	14.674
23	21 36 24.06	2.1583	11 46 55.8	13.658	23	23 15 50.25	2.0095	0 14 49.9	14.665
24	21 38 33.42	2.1537	S. 11 33 14.7	13.712	24	23 17 50.77	2.0080	S. 0 0 10.3	14.654

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 21.					WEDNESDAY 23.				
0	23 17 50.77	2.0080	S. 0 0 10.3	14.634	0	0 53 37.92	2.0043	N. 11 9 31.8	12.846
1	23 19 51.21	2.0066	N. 0 14 28.6	14.642	1	0 55 38.21	2.0055	11 22 20.7	12.783
2	23 21 51.56	2.0052	0 29 6.7	14.628	2	0 57 38.58	2.0067	11 35 5.8	12.720
3	23 23 51.83	2.0038	0 43 44.0	14.614	3	0 59 39.02	2.0080	11 47 47.1	12.656
4	23 25 52.03	2.0025	0 58 20.4	14.598	4	1 1 39.54	2.0093	12 0 24.5	12.590
5	23 27 52.13	2.0013	1 12 55.8	14.582	5	1 3 40.14	2.0107	12 12 57.9	12.524
6	23 29 52.18	2.0002	1 27 30.2	14.564	6	1 5 40.82	2.0120	12 25 27.4	12.457
7	23 31 52.16	1.9992	1 42 3.5	14.546	7	1 7 41.58	2.0134	12 37 52.8	12.390
8	23 33 52.08	1.9982	1 56 35.7	14.526	8	1 9 42.43	2.0149	12 50 14.2	12.322
9	23 35 51.94	1.9972	2 11 6.6	14.504	9	1 11 43.37	2.0163	13 2 31.4	12.252
10	23 37 51.75	1.9963	2 25 36.2	14.482	10	1 13 44.39	2.0178	13 14 44.4	12.182
11	23 39 51.50	1.9955	2 40 4.5	14.459	11	1 15 45.51	2.0195	13 26 53.2	12.110
12	23 41 51.21	1.9948	2 54 31.3	14.434	12	1 17 46.73	2.0211	13 38 57.6	12.037
13	23 43 50.88	1.9941	3 8 56.6	14.408	13	1 19 48.04	2.0227	13 50 57.7	11.965
14	23 45 50.50	1.9934	3 23 20.3	14.381	14	1 21 49.45	2.0244	14 2 53.4	11.891
15	23 47 50.09	1.9928	3 37 42.3	14.353	15	1 23 50.97	2.0261	14 14 44.6	11.816
16	23 49 49.64	1.9922	3 52 2.6	14.324	16	1 25 52.58	2.0277	14 26 31.3	11.740
17	23 51 49.16	1.9918	4 6 21.2	14.294	17	1 27 54.30	2.0295	14 38 13.4	11.663
18	23 53 48.66	1.9915	4 20 37.9	14.263	18	1 29 56.12	2.0313	14 49 50.9	11.587
19	23 55 48.14	1.9911	4 34 52.7	14.231	19	1 31 58.05	2.0332	15 1 23.8	11.509
20	23 57 47.59	1.9908	4 49 5.6	14.197	20	1 34 0.10	2.0350	15 12 52.0	11.430
21	23 59 47.03	1.9906	5 3 16.4	14.162	21	1 36 2.25	2.0368	15 24 15.4	11.350
22	0 1 46.46	1.9904	5 17 25.1	14.127	22	1 38 4.52	2.0387	15 35 34.0	11.269
23	0 3 45.88	1.9903	N. 5 31 31.7	14.091	23	1 40 6.90	2.0406	N. 15 46 47.7	11.188
TUESDAY 22.					THURSDAY 24.				
0	0 5 45.29	1.9902	N. 5 45 36.0	14.053	0	1 42 9.39	2.0425	N. 15 57 56.6	11.107
1	0 7 44.70	1.9902	5 59 38.0	14.014	1	1 44 12.00	2.0446	16 9 0.5	11.023
2	0 9 44.11	1.9903	6 13 37.7	13.975	2	1 46 14.74	2.0466	16 19 59.4	10.940
3	0 11 43.53	1.9903	6 27 35.0	13.934	3	1 48 17.59	2.0485	16 30 53.3	10.855
4	0 13 42.95	1.9905	6 41 29.8	13.892	4	1 50 20.56	2.0506	16 41 42.0	10.769
5	0 15 42.39	1.9907	6 55 22.0	13.848	5	1 52 23.66	2.0527	16 52 25.6	10.684
6	0 17 41.84	1.9910	7 9 11.6	13.805	6	1 54 26.88	2.0547	17 3 4.1	10.597
7	0 19 41.31	1.9913	7 22 58.6	13.760	7	1 56 30.22	2.0567	17 13 37.3	10.509
8	0 21 40.80	1.9917	7 36 42.8	13.714	8	1 58 33.69	2.0588	17 24 5.2	10.421
9	0 23 40.31	1.9921	7 50 24.3	13.667	9	2 0 37.28	2.0609	17 34 27.8	10.332
10	0 25 39.85	1.9926	8 4 2.9	13.619	10	2 2 41.00	2.0631	17 44 45.0	10.242
11	0 27 39.42	1.9931	8 17 38.6	13.571	11	2 4 44.85	2.0653	17 54 56.8	10.151
12	0 29 39.02	1.9937	8 31 11.4	13.522	12	2 6 48.84	2.0675	18 5 3.1	10.060
13	0 31 38.66	1.9943	8 44 41.2	13.470	13	2 8 52.95	2.0696	18 15 4.0	9.968
14	0 33 38.34	1.9950	8 58 7.8	13.418	14	2 10 57.19	2.0718	18 24 59.3	9.875
15	0 35 38.06	1.9957	9 11 31.3	13.365	15	2 13 1.57	2.0741	18 34 49.0	9.782
16	0 37 37.83	1.9965	9 24 51.6	13.311	16	2 15 6.08	2.0762	18 44 33.1	9.688
17	0 39 37.64	1.9973	9 38 8.6	13.256	17	2 17 10.71	2.0783	18 54 11.6	9.593
18	0 41 37.51	1.9982	9 51 22.3	13.201	18	2 19 15.48	2.0807	19 3 44.3	9.497
19	0 43 37.43	1.9992	10 4 32.7	13.144	19	2 21 20.39	2.0829	19 13 11.3	9.402
20	0 45 37.41	2.0001	10 17 39.6	13.086	20	2 23 25.43	2.0851	19 22 32.5	9.305
21	0 47 37.44	2.0011	10 30 43.0	13.027	21	2 25 30.60	2.0873	19 31 47.9	9.207
22	0 49 37.54	2.0022	10 43 42.9	12.968	22	2 27 35.91	2.0896	19 40 57.4	9.109
23	0 51 37.70	2.0032	10 56 39.2	12.907	23	2 29 41.35	2.0918	19 50 1.0	9.010
24	0 53 37.92	2.0043	N. 11 9 31.8	12.846	24	2 31 46.92	2.0940	N. 19 58 58.6	8.911

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 25.					SUNDAY 27.				
0	2 31 46.92	2.0940	N.19 58 58.6	8.911	0	4 14 38.60	2.1824	N.25 1 33.2	3.523
1	2 33 52.63	2.0962	20 7 50.3	8.811	1	4 16 49.58	2.1836	25 5 1.0	3.402
2	2 35 58.47	2.0985	20 16 35.9	8.709	2	4 19 0.63	2.1846	25 8 21.5	3.280
3	2 38 4.45	2.1007	20 25 15.4	8.608	3	4 21 11.73	2.1855	25 11 34.6	3.158
4	2 40 10.56	2.1030	20 33 48.9	8.507	4	4 23 22.89	2.1864	25 14 40.5	3.037
5	2 42 16.81	2.1052	20 42 16.2	8.405	5	4 25 34.10	2.1873	25 17 39.0	2.914
6	2 44 23.19	2.1074	20 50 37.3	8.300	6	4 27 45.37	2.1882	25 20 30.2	2.792
7	2 46 29.70	2.1097	20 58 52.2	8.197	7	4 29 56.68	2.1889	25 23 14.0	2.668
8	2 48 36.35	2.1119	21 7 0.9	8.092	8	4 32 8.04	2.1897	25 25 50.4	2.546
9	2 50 43.13	2.1141	21 15 3.3	7.988	9	4 34 19.44	2.1903	25 28 19.5	2.423
10	2 52 50.04	2.1162	21 22 59.4	7.882	10	4 36 30.88	2.1910	25 30 41.2	2.300
11	2 54 57.08	2.1184	21 30 49.1	7.775	11	4 38 42.36	2.1916	25 32 55.5	2.177
12	2 57 4.25	2.1206	21 38 32.4	7.668	12	4 40 53.87	2.1922	25 35 2.4	2.053
13	2 59 11.55	2.1227	21 46 9.3	7.562	13	4 43 5.42	2.1927	25 37 1.9	1.930
14	3 1 18.98	2.1249	21 53 39.8	7.454	14	4 45 16.99	2.1930	25 38 54.0	1.807
15	3 3 26.54	2.1270	22 1 3.8	7.345	15	4 47 28.58	2.1934	25 40 38.7	1.682
16	3 5 34.22	2.1291	22 8 21.2	7.236	16	4 49 40.20	2.1938	25 42 15.9	1.559
17	3 7 42.03	2.1312	22 15 32.1	7.127	17	4 51 51.84	2.1941	25 43 45.8	1.436
18	3 9 49.96	2.1332	22 22 36.4	7.017	18	4 54 3.49	2.1943	25 45 8.2	1.311
19	3 11 58.02	2.1353	22 29 34.1	6.907	19	4 56 15.16	2.1945	25 46 23.1	1.187
20	3 14 6.20	2.1374	22 36 25.2	6.796	20	4 58 26.83	2.1946	25 47 30.7	1.064
21	3 16 14.51	2.1394	22 43 9.6	6.684	21	5 0 38.51	2.1948	25 48 30.8	0.940
22	3 18 22.93	2.1414	22 49 47.3	6.572	22	5 2 50.20	2.1948	25 49 23.5	0.816
23	3 20 31.48	2.1434	N.22 56 18.2	6.459	23	5 5 1.89	2.1948	N.25 50 8.7	0.692
SATURDAY 26.					MONDAY 28.				
0	3 22 40.14	2.1453	N.23 2 42.4	6.347	0	5 7 13.57	2.1947	N.25 50 46.5	0.568
1	3 24 48.92	2.1472	23 8 59.8	6.234	1	5 9 25.25	2.1946	25 51 16.9	0.444
2	3 26 57.81	2.1492	23 15 10.5	6.121	2	5 11 36.92	2.1944	25 51 39.8	0.320
3	3 29 6.82	2.1510	23 21 14.3	6.006	3	5 13 48.58	2.1942	25 51 55.3	0.197
4	3 31 15.93	2.1528	23 27 11.2	5.891	4	5 16 0.22	2.1939	25 52 3.4	+0.073
5	3 33 25.16	2.1547	23 33 1.2	5.776	5	5 18 11.85	2.1937	25 52 4.0	-0.052
6	3 35 34.49	2.1564	23 38 44.3	5.661	6	5 20 23.46	2.1933	25 51 57.2	0.175
7	3 37 43.93	2.1582	23 44 20.5	5.546	7	5 22 35.04	2.1928	25 51 43.0	0.098
8	3 39 53.48	2.1599	23 49 49.8	5.429	8	5 24 46.60	2.1923	25 51 21.4	0.021
9	3 42 3.12	2.1616	23 55 12.0	5.313	9	5 26 58.12	2.1918	25 50 52.3	0.546
10	3 44 12.87	2.1632	24 0 27.3	5.196	10	5 29 9.61	2.1912	25 50 15.9	0.669
11	3 46 22.71	2.1648	24 5 35.5	5.078	11	5 31 21.07	2.1907	25 49 32.0	0.792
12	3 48 32.65	2.1664	24 10 36.6	4.960	12	5 33 32.49	2.1900	25 48 40.7	0.916
13	3 50 42.68	2.1680	24 15 30.7	4.842	13	5 35 43.87	2.1892	25 47 42.1	1.098
14	3 52 52.81	2.1695	24 20 17.7	4.724	14	5 37 55.20	2.1884	25 46 36.1	1.162
15	3 55 3.02	2.1709	24 24 57.6	4.605	15	5 40 6.48	2.1877	25 45 22.7	1.284
16	3 57 13.32	2.1724	24 29 30.3	4.486	16	5 42 17.72	2.1868	25 44 2.0	1.407
17	3 59 23.71	2.1738	24 33 55.9	4.367	17	5 44 28.90	2.1858	25 42 33.9	1.529
18	4 1 34.18	2.1752	24 38 14.3	4.247	18	5 46 40.02	2.1849	25 40 58.5	1.652
19	4 3 44.73	2.1765	24 42 25.5	4.127	19	5 48 51.09	2.1840	25 39 15.7	1.775
20	4 5 55.36	2.1777	24 46 29.5	4.007	20	5 51 2.10	2.1829	25 37 25.7	1.895
21	4 8 6.06	2.1790	24 50 26.3	3.887	21	5 53 13.04	2.1818	25 35 28.3	2.017
22	4 10 16.84	2.1802	24 54 15.9	3.766	22	5 55 23.91	2.1807	25 33 23.6	2.138
23	4 12 27.69	2.1813	24 57 58.2	3.644	23	5 57 34.72	2.1795	25 31 11.7	2.260
24	4 14 38.60	2.1824	N.25 1 33.2	3.523	24	5 59 45.45	2.1782	N.25 28 52.4	2.382



GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 29.					THURSDAY 31.				
0	5 59 45.45	a.1782	N.25 28 52.4	a.382	0	7 42 16.32	a.0848	N.21 21 20.5	7.777
1	6 1 56.11	a.1770	25 26 25.9	a.502	1	7 44 21.34	a.0825	21 13 30.8	7.878
2	6 4 6.69	a.1757	25 23 52.2	a.622	2	7 46 26.22	a.0802	21 5 35.1	7.979
3	6 6 17.19	a.1743	25 21 11.2	a.743	3	7 48 30.96	a.0779	20 57 33.3	8.080
4	6 8 27.61	a.1729	25 18 23.0	a.862	4	7 50 35.57	a.0757	20 49 25.5	8.180
5	6 10 37.94	a.1715	25 15 27.7	a.982	5	7 52 40.04	a.0734	20 41 11.7	8.279
6	6 12 48.19	a.1701	25 12 25.2	3.102	6	7 54 44.38	a.0712	20 32 52.0	8.377
7	6 14 58.35	a.1686	25 9 15.5	3.221	7	7 56 48.58	a.0689	20 24 26.4	8.475
8	6 17 8.42	a.1670	25 5 58.7	3.339	8	7 58 52.65	a.0667	20 15 55.0	8.573
9	6 19 18.39	a.1653	25 2 34.8	3.458	9	8 0 56.58	a.0644	20 7 17.7	8.670
10	6 21 28.26	a.1638	24 59 3.7	3.577	10	8 3 0.38	a.0623	19 58 34.6	8.766
11	6 23 38.04	a.1622	24 55 25.6	3.694	11	8 5 4.05	a.0602	19 49 45.8	8.862
12	6 25 47.72	a.1605	24 51 40.4	3.812	12	8 7 7.59	a.0578	19 40 51.2	8.957
13	6 27 57.30	a.1587	24 47 48.2	3.929	13	8 9 10.99	a.0557	19 31 50.9	9.052
14	6 30 6.77	a.1569	24 43 48.9	4.047	14	8 11 14.27	a.0536	19 22 45.0	9.146
15	6 32 16.13	a.1552	24 39 42.6	4.163	15	8 13 17.42	a.0514	19 13 33.4	9.239
16	6 34 25.39	a.1533	24 35 29.3	4.279	16	8 15 20.44	a.0492	19 4 16.3	9.332
17	6 36 34.53	a.1515	24 31 9.1	4.395	17	8 17 23.33	a.0472	18 54 53.6	9.425
18	6 38 43.57	a.1497	24 26 41.9	4.511	18	8 19 26.10	a.0451	18 45 25.3	9.517
19	6 40 52.49	a.1477	24 22 7.8	4.626	19	8 21 28.74	a.0430	18 35 51.6	9.607
20	6 43 1.30	a.1458	24 17 26.8	4.741	20	8 23 31.26	a.0409	18 26 12.5	9.697
21	6 45 9.99	a.1438	24 12 38.9	4.855	21	8 25 33.65	a.0389	18 16 27.9	9.788
22	6 47 18.56	a.1419	24 7 44.2	4.969	22	8 27 35.93	a.0370	18 6 37.9	9.877
23	6 49 27.02	a.1399	N.24 2 42.6	5.083	23	8 29 38.09	a.0349	N.17 56 42.6	9.966
WEDNESDAY 30.					FRIDAY, APRIL 1.				
0	6 51 35.35	a.1378	N.23 57 34.2	5.196	0	8 31 40.12	a.0329	N.17 46 42.0	10.053
1	6 53 43.56	a.1358	23 52 19.1	5.308	PHASES OF THE MOON.				
2	6 55 51.65	a.1337	23 46 57.2	5.422					
3	6 57 59.61	a.1316	23 41 28.5	5.534					
4	7 0 7.44	a.1295	23 35 53.1	5.645					
5	7 2 15.15	a.1274	23 30 11.1	5.756	☉ Full Moon . . . . March 7 21 28.7				
6	7 4 22.73	a.1253	23 24 22.4	5.867					
7	7 6 30.18	a.1231	23 18 27.1	5.977					
8	7 8 37.50	a.1209	23 12 25.2	6.087					
9	7 10 44.69	a.1187	23 6 16.7	6.196	☾ Last Quarter . . . . 14 19 48.6				
10	7 12 51.74	a.1164	23 0 1.7	6.304					
11	7 14 58.66	a.1142	22 53 40.2	6.412					
12	7 17 5.45	a.1120	22 47 12.2	6.521					
13	7 19 12.10	a.1098	22 40 37.7	6.628	● New Moon . . . . . 21 20 37.1				
14	7 21 18.62	a.1076	22 33 56.8	6.735					
15	7 23 25.01	a.1053	22 27 9.5	6.842					
16	7 25 31.26	a.1030	22 20 15.8	6.947					
17	7 27 37.37	a.1007	22 13 15.8	7.052	☾ Perigee . . . . . March 14 2.9				
18	7 29 43.34	a.0984	22 6 9.5	7.157					
19	7 31 49.18	a.0962	21 58 56.9	7.263					
20	7 33 54.88	a.0938	21 51 38.0	7.367					
21	7 36 0.44	a.0916	21 44 12.9	7.470	☾ Apogee . . . . . 28 13.5				
22	7 38 5.87	a.0893	21 36 41.6	7.573					
23	7 40 11.16	a.0871	21 29 4.1	7.676					
24	7 42 16.32	a.0848	N.21 21 20.5	7.777					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
1	SUN	W.	101 9 35	3463	102 30 40	3462	103 51 47	3460	105 12 56	3456
	α Arietis	W.	46 6 25	3100	47 34 35	3096	49 2 50	3092	50 31 9	3088
	Regulus	E.	66 17 51	3078	64 49 15	3076	63 20 36	3074	61 51 55	3071
	JUPITER	E.	106 5 16	3062	104 36 20	3060	103 7 21	3057	101 38 19	3053
2	SUN	W.	111 59 45	3434	113 21 23	3429	114 43 7	3422	116 4 59	3415
	α Arietis	W.	57 54 6	3063	59 23 1	3057	60 52 3	3050	62 21 14	3043
	Aldebaran	W.	26 37 19	3326	28 1 0	3295	29 25 17	3266	30 50 8	3239
	Regulus	E.	54 27 29	3052	52 58 21	3047	51 29 6	3041	49 59 44	3035
	JUPITER	E.	94 11 56	3031	92 42 22	3025	91 12 40	3019	89 42 51	3013
3	SUN	W.	122 56 19	3376	124 19 3	3367	125 41 57	3358	127 5 1	3348
	α Arietis	W.	69 49 27	3003	71 19 36	2993	72 49 57	2985	74 20 29	2975
	Aldebaran	W.	38 1 27	3133	39 28 56	3116	40 56 46	3099	42 24 57	3082
	Regulus	E.	42 30 57	3001	41 0 45	2993	39 30 24	2985	37 59 53	2977
	JUPITER	E.	82 11 37	2975	80 40 53	2967	79 9 59	2958	77 38 54	2949
	Spica	E.	96 33 0	2991	95 2 36	2983	93 32 2	2973	92 1 16	2965
4	α Arietis	W.	81 56 17	2924	83 28 6	2912	85 0 10	2901	86 32 28	2889
	Aldebaran	W.	49 50 53	3003	51 21 2	2989	52 51 29	2973	54 22 15	2958
	JUPITER	E.	70 0 29	2901	68 28 11	2890	66 55 39	2880	65 22 54	2869
	Spica	E.	84 24 24	2914	82 52 23	2902	81 20 7	2891	79 47 37	2880
5	α Arietis	W.	94 17 43	2829	95 51 33	2818	97 25 38	2805	98 59 59	2792
	Aldebaran	W.	62 0 45	2886	63 33 22	2871	65 6 18	2857	66 39 32	2842
	JUPITER	E.	57 35 42	2815	56 1 34	2804	54 27 11	2793	52 52 34	2782
	Spica	E.	72 1 22	2821	70 27 21	2808	68 53 4	2796	67 18 31	2783
	Antares	E.	117 45 6	2814	116 10 56	2801	114 36 30	2789	113 1 48	2776
6	Aldebaran	W.	74 30 17	2773	76 5 20	2760	77 40 41	2746	79 16 20	2733
	Pollux	W.	32 25 43	2801	34 0 10	2782	35 35 2	2763	37 10 19	2744
	JUPITER	E.	44 56 2	2732	43 20 5	2722	41 43 55	2713	40 7 33	2706
	Spica	E.	59 21 39	2721	57 45 27	2709	56 8 59	2696	54 32 14	2684
	Antares	E.	105 4 7	2713	103 27 44	2700	101 51 4	2687	100 14 7	2675
	SATURN	E.	109 6 52	2742	107 31 8	2729	105 55 7	2716	104 18 48	2703
7	Aldebaran	W.	87 18 55	2669	88 56 17	2656	90 33 56	2644	92 11 51	2633
	Pollux	W.	45 12 27	2663	46 49 57	2649	48 27 46	2634	50 5 55	2621
	Spica	E.	46 24 23	2624	44 46 1	2612	43 7 23	2601	41 28 30	2591
	Antares	E.	92 5 10	2612	90 26 32	2600	88 47 37	2588	87 8 26	2577
	SATURN	E.	96 12 54	2639	94 34 52	2626	92 56 33	2615	91 17 58	2602
8	Aldebaran	W.	100 25 16	2578	102 4 41	2568	103 44 20	2559	105 24 12	2549
	Pollux	W.	58 21 15	2556	60 1 11	2543	61 41 24	2532	63 21 53	2521
	Regulus	W.	21 19 29	2568	22 59 8	2551	24 39 10	2536	26 19 33	2521
	Antares	E.	78 48 31	2520	77 7 45	2510	75 26 45	2499	73 45 30	2489
	SATURN	E.	83 1 1	2545	81 20 51	2535	79 40 27	2525	77 59 48	2515
9	Pollux	W.	71 48 2	2470	73 29 58	2460	75 12 7	2452	76 54 28	2443
	Regulus	W.	34 46 9	2461	36 28 17	2450	38 10 40	2441	39 53 17	2431
	Antares	E.	65 15 47	2441	63 33 11	2432	61 50 22	2424	60 7 21	2416
	SATURN	E.	69 33 12	2468	67 51 14	2460	66 9 5	2453	64 26 45	2445

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	SUN	W.	106 34 9	3453	107 55 26	3449	109 16 47	3445	110 38 13	3439
	α Arietis	W.	51 59 33	3084	53 28 2	3079	54 56 37	3074	56 25 18	3069
	Regulus	E.	60 23 10	3069	58 54 22	3065	57 25 29	3061	55 56 32	3056
	JUPITER	E.	100 9 12	3050	98 40 1	3046	97 10 45	3042	95 41 24	3036
2	SUN	W.	117 26 58	3408	118 49 5	3400	120 11 21	3393	121 33 45	3385
	α Arietis	W.	63 50 34	3035	65 20 3	3028	66 49 41	3020	68 19 29	3012
	Aldebaran	W.	32 15 31	3215	33 41 22	3193	35 7 39	3173	36 34 21	3153
	Regulus	E.	48 30 15	3029	47 0 38	3022	45 30 53	3015	44 0 59	3009
	JUPITER	E.	88 12 54	3005	86 42 48	2999	85 12 34	2991	83 42 10	2984
3	SUN	W.	128 28 17	3338	129 51 44	3328	131 15 23	3319	132 39 13	3307
	α Arietis	W.	75 51 13	2965	77 22 10	2955	78 53 19	2945	80 24 41	2934
	Aldebaran	W.	43 53 29	3065	45 22 21	3050	46 51 32	3034	48 21 3	3018
	Regulus	E.	36 29 11	2969	34 58 19	2961	33 27 17	2952	31 56 4	2943
	JUPITER	E.	76 7 37	2940	74 36 9	2930	73 4 28	2920	71 32 35	2910
	Spica	E.	90 30 19	2954	88 59 9	2945	87 27 47	2935	85 56 12	2924
4	α Arietis	W.	88 5 1	2878	89 37 48	2866	91 10 51	2854	92 44 9	2842
	Aldebaran	W.	55 53 20	2944	57 24 43	2929	58 56 25	2914	60 28 26	2900
	JUPITER	E.	63 49 55	2858	62 16 42	2848	60 43 16	2837	59 9 36	2826
	Spica	E.	78 14 52	2869	76 41 53	2856	75 8 38	2845	73 35 8	2832
5	α Arietis	W.	100 34 37	2780	102 9 31	2768	103 44 41	2755	105 20 8	2742
	Aldebaran	W.	68 13 5	2828	69 46 56	2815	71 21 5	2801	72 55 32	2787
	JUPITER	E.	51 17 43	2772	49 42 38	2761	48 7 19	2751	46 31 47	2741
	Spica	E.	65 43 41	2771	64 8 35	2759	62 33 13	2746	60 57 34	2734
	Antares	E.	111 26 49	2764	109 51 34	2751	108 16 2	2738	106 40 13	2725
6	Aldebaran	W.	80 52 16	2719	82 28 30	2707	84 5 1	2694	85 41 49	2681
	Pollux	W.	38 46 0	2727	40 22 4	2710	41 58 30	2694	43 35 18	2678
	JUPITER	E.	38 31 1	2698	36 54 18	2692	35 17 27	2686	33 40 28	2681
	Spica	E.	52 55 12	2672	51 17 54	2660	49 40 20	2648	48 2 30	2635
	Antares	E.	98 36 54	2662	96 59 23	2650	95 21 36	2637	93 43 31	2625
	SATURN	E.	102 42 12	2689	101 5 18	2677	99 28 7	2664	97 50 39	2652
7	Aldebaran	W.	93 50 1	2621	95 28 27	2610	97 7 9	2599	98 46 5	2588
	Pollux	W.	51 44 22	2607	53 23 8	2593	55 2 13	2580	56 41 35	2567
	Spica	E.	39 49 23	2580	38 10 1	2569	36 30 24	2560	34 50 34	2550
	Antares	E.	85 28 59	2564	83 49 15	2553	82 9 16	2542	80 29 1	2531
	SATURN	E.	89 39 6	2591	87 59 58	2580	86 20 35	2568	84 40 56	2556
8	Aldebaran	W.	107 4 17	2540	108 44 34	2532	110 25 3	2524	112 5 43	2515
	Pollux	W.	65 2 37	2510	66 43 37	2499	68 24 51	2489	70 6 20	2480
	Regulus	W.	28 0 17	2508	29 41 19	2495	31 22 39	2483	33 4 16	2472
	Antares	E.	72 4 1	2479	70 22 18	2469	68 40 21	2460	66 58 11	2450
	SATURN	E.	76 18 56	2505	74 37 50	2495	72 56 30	2486	71 14 57	2477
9	Pollux	W.	78 37 2	2435	80 19 47	2426	82 2 44	2419	83 45 51	2412
	Regulus	W.	41 36 7	2423	43 19 9	2414	45 2 24	2406	46 45 50	2398
	Antares	E.	58 24 9	2408	56 40 45	2401	54 57 11	2393	53 13 26	2387
	SATURN	E.	62 44 14	2438	61 1 33	2431	59 18 42	2424	57 35 42	2418

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Pollux W.	85 29 8	2405	87 12 35	2399	88 56 11	2393	90 39 56	2387
	Regulus W.	48 29 28	2391	50 13 16	2384	51 57 14	2377	53 41 22	2371
	Antares E.	51 29 32	2380	49 45 28	2373	48 1 14	2367	46 16 52	2361
	SATURN E.	55 52 33	2412	54 9 16	2407	52 25 51	2403	50 42 20	2398
	α Aquilæ E.	104 22 46	2988	102 52 18	2973	101 21 32	2959	99 50 28	2947
11	Pollux W.	99 20 40	2362	101 5 9	2358	102 49 44	2355	104 34 24	2351
	Regulus W.	62 24 10	2343	64 9 7	2339	65 54 10	2335	67 39 19	2331
	Antares E.	37 33 1	2336	35 47 54	2332	34 2 41	2328	32 17 22	2324
	α Aquilæ E.	92 11 51	2995	90 39 39	2991	89 7 21	2987	87 34 58	2984
	MARS E.	111 32 20	2591	109 53 13	2586	108 13 59	2583	106 34 40	2578
12	Regulus W.	76 26 23	2315	78 12 1	2313	79 57 42	2310	81 43 27	2308
	JUPITER W.	38 10 50	2339	39 55 52	2333	41 41 4	2326	43 26 25	2320
	Spica W.	22 28 14	2346	24 13 6	2339	25 58 8	2333	27 43 19	2328
	α Aquilæ E.	79 52 50	2991	78 20 33	2996	76 48 22	2913	75 16 20	2921
	MARS E.	98 16 47	2562	96 37 0	2559	94 57 9	2557	93 17 15	2556
	Fomalhaut E.	104 34 46	2732	102 58 49	2723	101 22 40	2716	99 46 22	2710
13	Regulus W.	90 32 50	2301	92 18 48	2300	94 4 48	2300	95 50 48	2299
	JUPITER W.	52 15 3	2300	54 1 3	2297	55 47 7	2294	57 33 15	2292
	Spica W.	36 30 52	2311	38 16 36	2309	40 2 23	2307	41 48 13	2305
	α Aquilæ E.	67 39 21	2985	66 8 50	3003	64 38 41	3024	63 8 58	3047
	MARS E.	84 57 11	2548	83 17 5	2548	81 36 58	2547	79 56 50	2547
	Fomalhaut E.	91 43 9	2692	90 6 19	2691	88 29 27	2691	86 52 35	2692
	SUN E.	113 56 35	2626	112 18 15	2624	110 39 53	2624	109 1 30	2623
14	JUPITER W.	66 24 33	2285	68 10 54	2285	69 57 15	2285	71 43 37	2285
	Spica W.	50 37 47	2302	52 23 44	2301	54 9 42	2301	55 55 40	2302
	α Aquilæ E.	55 48 27	2904	54 22 22	2945	52 57 6	2992	51 32 45	3043
	MARS E.	71 36 9	2548	69 56 2	2548	68 15 55	2549	66 35 50	2550
	Fomalhaut E.	78 48 57	2710	77 12 30	2716	75 36 11	2722	74 0 1	2732
	SUN E.	100 49 24	2621	99 10 58	2622	97 32 33	2622	95 54 8	2623
15	JUPITER W.	80 35 20	2287	82 21 38	2288	84 7 55	2289	85 54 10	2291
	Spica W.	64 45 19	2304	66 31 12	2306	68 17 3	2307	70 2 52	2308
	MARS E.	58 15 49	2557	56 35 55	2559	54 56 4	2561	53 16 16	2564
	Fomalhaut E.	66 2 30	2791	64 27 50	2807	62 53 31	2825	61 19 35	2844
	SUN E.	87 42 19	2628	86 4 2	2629	84 25 47	2631	82 47 34	2632
16	JUPITER W.	94 44 52	2300	96 30 52	2302	98 16 48	2304	100 2 41	2307
	Spica W.	78 51 26	2317	80 37 1	2320	82 22 32	2322	84 8 0	2324
	Antares W.	33 5 50	2312	34 51 32	2314	36 37 11	2317	38 22 46	2319
	SATURN W.	29 13 24	2388	30 57 16	2393	32 41 15	2398	34 25 19	2376
	MARS E.	44 58 10	2579	43 18 46	2583	41 39 27	2586	40 0 13	2591
	Fomalhaut E.	53 37 5	2976	52 6 22	3010	50 36 22	3049	49 7 10	3091
	SUN E.	74 37 9	2643	72 59 13	2646	71 21 21	2649	69 43 33	2652
17	Spica W.	92 54 24	2338	94 39 28	2342	96 24 27	2345	98 9 21	2349
	Antares W.	47 9 47	2333	48 54 58	2336	50 40 5	2339	52 25 7	2344
	SATURN W.	43 6 22	2373	44 50 36	2374	46 34 48	2375	48 18 58	2377
	SUN E.	61 35 39	2670	59 58 19	2675	58 21 5	2679	56 43 57	2684

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	Pollux W.	92 23 50	2381	94 7 52	2376	95 52 1	2371	97 36 17	2366
	Regulus W.	55 25 39	2364	57 10 5	2359	58 54 39	2353	60 39 21	2348
	Antares E.	44 32 21	2355	42 47 42	2350	41 2 55	2345	39 18 1	2341
	SATURN E.	48 58 42	2394	47 14 59	2390	45 31 10	2387	43 47 17	2384
	α Aquilæ E.	98 19 9	2936	96 47 36	2927	95 15 51	2919	93 43 56	2911
11	Pollux W.	106 19 9	2348	108 3 58	2346	109 48 51	2344	111 33 47	2341
	Regulus W.	69 24 34	2327	71 9 54	2324	72 55 19	2320	74 40 49	2317
	Antares E.	30 31 58	2321	28 46 29	2318	27 0 56	2315	25 15 19	2313
	α Aquilæ E.	86 2 32	2894	84 30 5	2894	82 57 38	2894	81 25 12	2898
	MARS E.	104 55 15	2574	103 15 45	2571	101 36 10	2568	99 56 31	2564
12	Regulus W.	83 29 15	2307	85 15 5	2304	87 0 58	2303	88 46 53	2302
	JUPITER W.	45 11 55	2315	46 57 33	2311	48 43 17	2307	50 29 7	2302
	Spica W.	29 28 38	2323	31 14 4	2320	32 59 35	2316	34 45 11	2313
	α Aquilæ E.	73 44 28	2931	72 12 48	2942	70 41 22	2954	69 10 12	2969
	MARS E.	91 37 19	2553	89 57 20	2552	88 17 19	2551	86 37 16	2549
	Fomalhaut E.	98 9 55	2704	96 33 21	2700	94 56 41	2697	93 19 57	2694
13	Regulus W.	97 36 49	2299	99 22 50	2298	101 8 52	2299	102 54 53	2298
	JUPITER W.	59 19 26	2290	61 5 40	2289	62 51 56	2287	64 38 14	2287
	Spica W.	43 34 5	2304	45 19 59	2303	47 5 54	2302	48 51 50	2302
	α Aquilæ E.	61 39 43	2372	60 10 59	23101	58 42 50	2312	57 15 18	2316
	MARS E.	78 16 42	2546	76 36 33	2547	74 56 25	2547	73 16 17	2547
	Fomalhaut E.	85 15 45	2694	83 38 57	2696	82 2 12	2700	80 25 32	2704
	SUN E.	107 23 6	2622	105 44 41	2622	104 6 16	2621	102 27 50	2621
14	JUPITER W.	73 29 58	2285	75 16 19	2285	77 2 40	2286	78 49 0	2286
	Spica W.	57 41 37	2302	59 27 34	2302	61 13 30	2303	62 59 25	2304
	α Aquilæ E.	50 9 23	2400	48 47 6	2463	47 26 1	2533	46 6 13	2610
	MARS E.	64 55 46	2551	63 15 44	2552	61 35 43	2554	59 55 45	2556
	Fomalhaut E.	72 24 3	2741	70 48 17	2751	69 12 45	2763	67 37 29	2776
	SUN E.	94 15 44	2624	92 37 21	2624	90 58 59	2625	89 20 38	2626
15	JUPITER W.	87 40 23	2292	89 26 34	2294	91 12 43	2296	92 58 49	2298
	Spica W.	71 48 40	2310	73 34 25	2311	75 20 8	2313	77 5 48	2315
	MARS E.	51 36 31	2566	49 56 50	2569	48 17 12	2572	46 37 39	2575
	Fomalhaut E.	59 46 4	2866	58 13 1	2889	56 40 28	2915	55 8 28	2944
	SUN E.	81 9 23	2635	79 31 15	2637	77 53 10	2639	76 15 8	2641
16	JUPITER W.	101 48 30	2310	103 34 15	2313	105 19 55	2317	107 5 30	2320
	Spica W.	85 53 25	2326	87 38 46	2329	89 24 3	2332	91 9 16	2335
	Antares W.	40 8 18	2322	41 53 46	2324	43 39 11	2327	45 24 31	2330
	SATURN W.	36 9 28	2374	37 53 40	2373	39 37 53	2373	41 22 7	2372
	MARS E.	38 21 6	2596	36 42 5	2601	35 3 12	2607	33 24 27	2613
	Fomalhaut E.	47 38 50	2339	46 11 28	2392	44 45 9	2351	43 20 0	2316
	SUN E.	68 5 49	2655	66 28 9	2659	64 50 34	2663	63 13 4	2666
17	Spica W.	99 54 9	2353	101 38 51	2357	103 23 28	2361	105 7 59	2366
	Antares W.	54 10 3	2348	55 54 53	2351	57 39 38	2351	59 24 17	2359
	SATURN W.	50 3 6	2379	51 47 11	2382	53 31 12	2384	55 15 9	2388
	SUN E.	55 6 55	2689	53 30 0	2694	51 53 12	2700	50 16 32	2705

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
18	Antares W.	61 8 50	2364	62 53 16	2368	64 37 36	2374	66 21 48	2379
	SATURN W.	56 59 1	2391	58 42 49	2395	60 26 31	2398	62 10 8	2403
	SUN E.	48 39 59	2712	47 3 35	2718	45 27 19	2725	43 51 13	2732
19	Antares W.	75 0 53	2408	76 44 17	2415	78 27 31	2421	80 10 36	2428
	SATURN W.	70 46 29	2429	72 29 22	2435	74 12 7	2441	75 54 43	2448
	SUN E.	35 53 17	2776	34 18 18	2786	32 43 32	2798	31 9 2	2811
23	SUN W.	14 38 17	3274	16 2 59	3254	17 28 4	3242	18 53 24	3233
	Aldebaran E.	52 40 40	2801	51 6 14	2818	49 32 9	2834	47 58 25	2851
	Pollux E.	94 30 49	2740	92 55 2	2752	91 19 31	2764	89 44 16	2775
24	SUN W.	26 1 15	3236	27 26 41	3242	28 52 0	3250	30 17 10	3257
	Aldebaran E.	40 15 25	2945	38 44 3	2965	37 13 7	2988	35 42 39	3012
	Pollux E.	81 51 52	2835	80 18 10	2847	78 44 43	2859	77 11 31	2871
25	SUN W.	37 20 42	3300	38 44 54	3309	40 8 55	3319	41 32 45	3327
	Pollux E.	69 29 18	2928	67 57 35	2940	66 26 7	2950	64 54 52	2962
	Regulus E.	106 22 21	2904	104 50 7	2915	103 18 7	2925	101 46 20	2935
26	SUN W.	48 29 21	3371	49 52 11	3379	51 14 51	3387	52 37 22	3395
	Pollux E.	57 22 0	3014	55 52 4	3024	54 22 21	3034	52 52 50	3043
	Regulus E.	94 10 26	2981	92 39 50	2989	91 9 24	2997	89 39 8	3005
27	SUN W.	59 27 53	3429	60 49 37	3434	62 11 15	3439	63 32 47	3445
	α Arietis W.	30 24 59	3095	31 53 15	3096	33 21 30	3096	34 49 44	3098
	Pollux E.	45 28 6	3089	43 59 43	3097	42 31 30	3106	41 3 28	3114
	Regulus E.	82 10 6	3039	80 40 42	3045	79 11 25	3050	77 42 14	3056
28	SUN W.	70 19 15	3462	71 40 22	3464	73 1 26	3465	74 22 29	3467
	α Arietis W.	42 10 36	3101	43 38 44	3101	45 6 52	3101	46 35 0	3101
	Regulus E.	70 17 42	3073	68 49 0	3076	67 20 21	3078	65 51 44	3079
	JUPITER E.	106 49 19	3047	105 20 4	3049	103 50 52	3050	102 21 41	3052
29	SUN W.	81 7 34	3465	82 28 37	3463	83 49 43	3461	85 10 51	3457
	α Arietis W.	53 55 53	3095	55 24 9	3091	56 52 29	3089	58 20 52	3085
	Regulus E.	58 28 56	3079	57 0 21	3078	55 31 45	3077	54 3 7	3074
	JUPITER E.	94 55 55	3050	93 26 44	3047	91 57 30	3046	90 28 14	3043
30	SUN W.	91 57 33	3435	93 19 10	3430	94 40 53	3423	96 2 44	3416
	α Arietis W.	65 44 1	3062	67 12 57	3056	68 42 0	3050	70 11 11	3043
	Aldebaran W.	33 59 16	3214	35 25 8	3197	36 51 21	3181	38 17 53	3164
	Regulus E.	46 39 4	3056	45 10 1	3052	43 40 53	3047	42 11 38	3042
	JUPITER E.	83 0 52	3023	81 31 8	3018	80 1 17	3012	78 31 19	3006
	Spica E.	100 41 21	3049	99 12 9	3043	97 42 49	3037	96 13 22	3030
31	SUN W.	102 54 7	3373	104 16 54	3364	105 39 52	3354	107 3 1	3343
	α Arietis W.	77 39 24	3002	79 9 34	2993	80 39 56	2983	82 10 30	2973
	Aldebaran W.	45 35 15	3090	47 3 37	3076	48 32 16	3062	50 1 12	3047
	Regulus E.	34 43 34	3009	33 13 32	3002	31 43 22	2994	30 13 2	2987
	JUPITER E.	70 59 27	2969	69 28 36	2961	67 57 34	2952	66 26 21	2943
	Spica E.	88 43 54	2991	87 13 30	2981	85 42 54	2972	84 12 6	2962

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
18	Antares	W.	68 5 53	2384	69 49 50	2389	71 33 40	2396	73 17 21	2402
	SATURN	W.	63 53 38	2408	65 37 2	2413	67 20 18	2418	69 3 27	2423
	SUN	E.	42 15 16	2741	40 39 30	2748	39 3 54	2756	37 28 29	2766
19	Antares	W.	81 53 31	2435	83 36 16	2444	85 18 51	2450	87 1 15	2458
	SATURN	W.	77 37 10	2455	79 19 27	2461	81 1 35	2469	82 43 32	2476
	SUN	E.	29 34 48	2825	28 0 52	2839	26 27 15	2855	24 53 59	2873
23	SUN	W.	20 18 54	3229	21 44 29	3226	23 10 7	3228	24 35 43	3231
	Aldebaran	E.	46 25 3	2868	44 52 3	2886	43 19 26	2905	41 47 13	2924
	Pollux	E.	88 9 16	2788	86 34 32	2799	85 0 3	2811	83 25 50	2823
24	SUN	W.	31 42 12	3265	33 7 4	3273	34 31 47	3282	35 56 20	3291
	Aldebaran	E.	34 12 41	3037	32 43 14	3065	31 14 21	3095	29 46 5	3128
	Pollux	E.	75 38 35	2883	74 5 54	2894	72 33 27	2905	71 1 15	2917
25	SUN	W.	42 56 25	3337	44 19 54	3345	45 43 13	3354	47 6 22	3363
	Pollux	E.	63 23 51	2972	61 53 3	2983	60 22 29	2993	58 52 8	3004
	Regulus	E.	100 14 45	2944	98 43 22	2954	97 12 12	2963	95 41 13	2973
26	SUN	W.	53 59 44	3402	55 21 58	3409	56 44 4	3416	58 6 2	3423
	Pollux	E.	51 23 30	3052	49 54 22	3062	48 25 26	3070	46 56 40	3080
	Regulus	E.	88 9 2	3013	86 39 5	3020	85 9 17	3026	83 39 37	3034
27	SUN	W.	64 54 13	3448	66 15 35	3453	67 36 52	3456	68 58 5	3459
	α Arietis	W.	36 17 56	3098	37 46 8	3100	39 14 18	3101	40 42 27	3101
	Pollux	E.	39 35 36	3124	38 7 55	3133	36 40 25	3142	35 13 6	3151
	Regulus	E.	76 13 10	3060	74 44 11	3064	73 15 17	3067	71 46 27	3071
28	SUN	W.	75 43 30	3467	77 4 31	3468	78 25 31	3467	79 46 32	3466
	α Arietis	W.	48 3 8	3101	49 31 17	3100	50 59 27	3098	52 27 39	3096
	Regulus	E.	64 23 9	3080	62 54 35	3081	61 26 2	3081	59 57 29	3081
	JUPITER	E.	100 52 32	3052	99 23 23	3052	97 54 14	3052	96 25 5	3051
29	SUN	W.	86 32 3	3454	87 53 18	3450	89 14 38	3446	90 36 3	3441
	α Arietis	W.	59 49 20	3082	61 17 52	3078	62 46 29	3073	64 15 12	3068
	Regulus	E.	52 34 26	3072	51 5 42	3069	49 36 54	3065	48 8 1	3061
	JUPITER	E.	88 58 54	3040	87 29 31	3036	86 0 3	3032	84 30 30	3028
30	SUN	W.	97 24 42	3408	98 46 49	3400	100 9 5	3392	101 31 31	3383
	α Arietis	W.	71 40 30	3035	73 9 59	3028	74 39 37	3020	76 9 25	3011
	Aldebaran	W.	39 44 45	3149	41 11 55	3133	42 39 24	3119	44 7 11	3105
	Regulus	E.	40 42 17	3035	39 12 48	3030	37 43 12	3022	36 13 27	3016
	JUPITER	E.	77 1 14	3000	75 31 1	2993	74 0 39	2985	72 30 8	2977
	Spica	E.	94 43 47	3023	93 14 3	3016	91 44 10	3008	90 14 7	3000
31	SUN	W.	108 26 23	3332	109 49 58	3320	111 13 46	3309	112 37 47	3296
	α Arietis	W.	83 41 16	2962	85 12 16	2952	86 43 29	2940	88 14 57	2929
	Aldebaran	W.	51 30 26	3033	52 59 58	3019	54 29 47	3005	55 59 54	2989
	Regulus	E.	28 42 33	2980	27 11 55	2973	25 41 8	2965	24 10 12	2959
	JUPITER	E.	64 54 57	2933	63 23 20	2924	61 51 31	2913	60 19 29	2903
	Spica	E.	82 41 6	2951	81 9 52	2941	79 38 25	2930	78 6 44	2918

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to		Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.	Subtracted from Apparent Time.				
		h m s	s	° ' "	"	' "	s	m s	s		
Frid.	1	0 43 20.88	9.099	N. 4 39 47.7	+57.77	16 2.10	64.53	3 52.37	0.756		
Sat.	2	0 46 59.31	9.103	5 2 51.5	57.55	16 1.82	64.55	3 34.29	0.751		
SUN.	3	0 50 37.86	9.109	5 25 49.9	57.31	16 1.55	64.57	3 16.33	0.745		
Mon.	4	0 54 16.55	9.116	5 48 42.5	+57.06	16 1.28	64.59	2 58.52	0.739		
Tues.	5	0 57 55.40	9.123	6 11 29.1	56.81	16 1.01	64.62	2 40.86	0.731		
Wed.	6	1 1 34.44	9.131	6 34 9.3	56.54	16 0.73	64.65	2 23.39	0.723		
Thur.	7	1 5 13.68	9.140	6 56 42.8	+56.25	16 0.46	64.68	2 6.14	0.714		
Frid.	8	1 8 53.15	9.150	7 19 9.3	55.95	16 0.18	64.71	1 49.09	0.705		
Sat.	9	1 12 32.87	9.161	7 41 28.4	55.64	15 59.90	64.75	1 32.30	0.694		
SUN.	10	1 16 12.86	9.173	8 3 39.9	+55.31	15 59.62	64.79	1 15.79	0.682		
Mon.	11	1 19 53.14	9.185	8 25 43.4	54.97	15 59.34	64.83	0 59.56	0.669		
Tues.	12	1 23 33.74	9.198	8 47 38.7	54.62	15 59.07	64.87	0 43.64	0.656		
Wed.	13	1 27 14.66	9.212	9 9 25.2	+54.25	15 58.79	64.92	0 28.06	0.642		
Thur.	14	1 30 55.92	9.227	9 31 2.8	53.87	15 58.52	64.97	0 12.81	0.628		
Frid.	15	1 34 37.55	9.242	9 52 31.0	53.47	15 58.25	65.02	0 2.08	0.612		
Sat.	16	1 38 19.55	9.258	10 13 49.5	+53.06	15 57.98	65.07	0 16.60	0.596		
SUN.	17	1 42 1.94	9.275	10 34 58.0	52.64	15 57.71	65.13	0 30.71	0.580		
Mon.	18	1 45 44.73	9.292	10 55 56.0	52.20	15 57.44	65.19	0 44.44	0.563		
Tues.	19	1 49 27.94	9.309	11 16 43.4	+51.74	15 57.18	65.25	0 57.75	0.546		
Wed.	20	1 53 11.56	9.327	11 37 19.6	51.27	15 56.92	65.31	1 10.64	0.528		
Thur.	21	1 56 55.63	9.345	11 57 44.4	50.79	15 56.66	65.37	1 23.11	0.510		
Frid.	22	2 0 40.13	9.364	12 17 57.3	+50.29	15 56.40	65.44	1 35.12	0.491		
Sat.	23	2 4 25.08	9.383	12 37 58.1	49.77	15 56.15	65.50	1 46.70	0.472		
SUN.	24	2 8 10.49	9.402	12 57 46.4	49.24	15 55.90	65.57	1 57.80	0.453		
Mon.	25	2 11 56.37	9.421	13 17 21.8	+48.70	15 55.65	65.64	2 8.45	0.434		
Tues.	26	2 15 42.72	9.441	13 36 44.1	48.15	15 55.41	65.71	2 18.63	0.414		
Wed.	27	2 19 29.55	9.462	13 55 52.9	47.58	15 55.17	65.78	2 28.33	0.394		
Thur.	28	2 23 16.88	9.482	14 14 47.8	+47.00	15 54.93	65.85	2 37.53	0.373		
Frid.	29	2 27 4.70	9.503	14 33 28.7	46.40	15 54.70	65.93	2 46.24	0.352		
Sat.	30	2 30 53.03	9.524	14 51 55.1	45.79	15 54.47	66.01	2 54.44	0.331		
SUN.	31	2 34 41.88	9.546	N. 15 10 6.8	+45.18	15 54.24	66.09	3 2.13	0.310		

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Added to Mean Time.		
		h m s	s	° ' "	"	m s	s	h m s
Frid.	1	0 43 20.30	9.101	N. 4 39 44.0	+57.78	3 52.42	0.756	0 39 27.88
Sat.	2	0 46 58.77	9.106	5 2 48.1	57.56	3 34.33	0.751	0 43 24.44
SUN.	3	0 50 37.36	9.111	5 25 46.8	57.33	3 16.37	0.745	0 47 20.99
Mon.	4	0 54 16.10	9.117	5 48 39.7	+57.08	2 58.56	0.739	0 51 17.54
Tues.	5	0 57 54.99	9.124	6 11 26.6	56.82	2 40.89	0.731	0 55 14.10
Wed.	6	1 1 34.07	9.133	6 34 7.0	56.55	2 23.42	0.723	0 59 10.65
Thur.	7	1 5 13.36	9.142	6 56 40.8	+56.26	2 6.16	0.714	1 3 7.20
Frid.	8	1 8 52.87	9.152	7 19 7.6	55.96	1 49.11	0.705	1 7 3.76
Sat.	9	1 12 32.63	9.162	7 41 27.0	55.65	1 32.32	0.694	1 11 0.31
SUN.	10	1 16 12.67	9.174	8 3 38.8	+55.32	1 15.81	0.682	1 14 56.86
Mon.	11	1 19 52.99	9.187	8 25 42.5	54.98	0 59.57	0.669	1 18 53.42
Tues.	12	1 23 33.62	9.200	8 47 38.0	54.63	0 43.65	0.656	1 22 49.97
Wed.	13	1 27 14.59	9.214	9 9 24.8	+54.26	0 28.07	0.642	1 26 46.52
Thur.	14	1 30 55.89	9.229	9 31 2.6	53.88	0 12.81	0.628	1 30 43.08
Frid.	15	1 34 37.55	9.244	9 52 31.0	53.48	0 2.08	0.612	1 34 39.63
Sat.	16	1 38 19.59	9.260	10 13 49.7	+53.07	0 16.60	0.596	1 38 36.19
SUN.	17	1 42 2.02	9.276	10 34 58.4	52.64	0 30.72	0.580	1 42 32.74
Mon.	18	1 45 44.85	9.293	10 55 56.7	52.20	0 44.45	0.563	1 46 29.30
Tues.	19	1 49 28.09	9.310	11 16 44.2	+51.75	0 57.76	0.546	1 50 25.85
Wed.	20	1 53 11.75	9.328	11 37 20.6	51.28	1 10.65	0.528	1 54 22.40
Thur.	21	1 56 55.84	9.346	11 57 45.5	50.79	1 23.12	0.510	1 58 18.96
Frid.	22	2 0 40.38	9.365	12 17 58.6	+50.29	1 35.13	0.491	2 2 15.51
Sat.	23	2 4 25.36	9.384	12 37 59.6	49.78	1 46.71	0.472	2 6 12.07
SUN.	24	2 8 10.80	9.403	12 57 48.0	49.25	1 57.82	0.453	2 10 8.62
Mon.	25	2 11 56.71	9.423	13 17 23.6	+48.71	2 8.47	0.434	2 14 5.18
Tues.	26	2 15 43.08	9.443	13 36 46.0	48.15	2 18.65	0.414	2 18 1.73
Wed.	27	2 19 29.94	9.463	13 55 54.9	47.58	2 28.35	0.394	2 21 58.29
Thur.	28	2 23 17.29	9.483	14 14 49.9	+47.00	2 37.55	0.373	2 25 54.84
Frid.	29	2 27 5.14	9.504	14 33 30.9	46.41	2 46.26	0.352	2 29 51.40
Sat.	30	2 30 53.49	9.525	14 51 57.4	45.80	2 54.46	0.331	2 33 47.95
SUN.	31	2 34 42.36	9.547	N. 15 10 9.1	+45.18	3 2.15	0.310	2 37 44.51

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour,  
+9°.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	91	11 47 23.1	46 55.3	147.82	— 0.23	9.9999575	+51.1	h m s 23 16 42.68
2	92	12 46 29.7	46 1.8	147.72	0.35	0.0000803	51.2	23 12 46.77
3	93	13 45 34.0	45 6.0	147.63	0.46	0.0002032	51.3	23 8 50.86
4	94	14 44 36.1	44 8.0	147.54	— 0.55	0.0003265	+51.4	23 4 54.95
5	95	15 43 36.0	43 7.8	147.45	0.61	0.0004501	51.6	23 0 59.04
6	96	16 42 33.9	42 5.6	147.37	0.64	0.0005743	51.8	22 57 3.14
7	97	17 41 29.7	41 1.3	147.29	— 0.64	0.0006988	+51.9	22 53 7.23
8	98	18 40 23.7	39 55.1	147.21	0.61	0.0008235	52.0	22 49 11.32
9	99	19 39 15.7	38 47.0	147.13	0.56	0.0009487	52.1	22 45 15.41
10	100	20 38 5.8	37 37.0	147.05	— 0.47	0.0010737	+52.1	22 41 19.51
11	101	21 36 54.3	36 25.4	146.98	0.36	0.0011990	52.1	22 37 23.60
12	102	22 35 41.0	35 12.0	146.91	0.24	0.0013240	52.0	22 33 27.69
13	103	23 34 26.0	33 56.8	146.84	— 0.12	0.0014487	+51.9	22 29 31.78
14	104	24 33 9.3	32 40.0	146.77	+ 0.01	0.0015731	51.7	22 25 35.87
15	105	25 31 50.9	31 21.5	146.70	0.14	0.0016968	51.4	22 21 39.96
16	106	26 30 30.8	30 1.3	146.63	+ 0.26	0.0018197	+51.0	22 17 44.06
17	107	27 29 9.0	28 39.3	146.56	0.34	0.0019418	50.6	22 13 48.15
18	108	28 27 45.5	27 15.7	146.49	0.41	0.0020627	50.1	22 9 52.24
19	109	29 26 20.2	25 50.3	146.42	+ 0.46	0.0021825	+49.6	22 5 56.33
20	110	30 24 53.1	24 23.1	146.34	0.48	0.0023010	49.1	22 2 0.42
21	111	31 23 24.2	22 54.1	146.26	0.46	0.0024182	48.6	21 58 4.52
22	112	32 21 53.4	21 23.2	146.18	+ 0.42	0.0025341	+48.0	21 54 8.61
23	113	33 20 20.6	19 50.2	146.10	0.35	0.0026485	47.4	21 50 12.70
24	114	34 18 45.8	18 15.3	146.01	0.25	0.0027614	46.8	21 46 16.79
25	115	35 17 9.0	16 38.4	145.92	+ 0.13	0.0028732	+46.2	21 42 20.88
26	116	36 15 30.0	14 59.3	145.83	0.00	0.0029838	45.7	21 38 24.97
27	117	37 13 49.1	13 18.2	145.74	— 0.13	0.0030931	45.3	21 34 29.06
28	118	38 12 6.1	11 35.1	145.66	— 0.26	0.0032013	+44.9	21 30 33.15
29	119	39 10 21.0	9 49.8	145.58	0.39	0.0033084	44.5	21 26 37.24
30	120	40 8 33.8	8 2.5	145.49	0.50	0.0034147	44.1	21 22 41.33
31	121	41 6 44.7	6 13.3	145.41	— 0.59	0.0035202	+43.8	21 18 45.42
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0.0.								
								Diff. for 1 Hour, —9 <sup>s</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
1	15 4.7	15 9.6	55 13.7	+1.41	55 31.7	+1.58	h m 8 7.3	m 1.91	d 10.1
2	15 15.0	15 20.8	55 51.5	1.71	56 12.8	1.82	8 52.8	1.88	11.1
3	15 26.9	15 33.2	56 35.2	1.90	56 58.4	1.94	9 37.8	1.88	12.1
4	15 39.6	15 46.0	57 21.8	+1.95	57 45.1	+1.91	10 23.4	1.92	13.1
5	15 52.1	15 58.0	58 7.7	1.84	58 29.2	1.73	11 10.4	2.01	14.1
6	16 3.4	16 8.3	58 49.1	1.58	59 7.0	1.39	12 0.0	2.13	15.1
7	16 12.5	16 16.0	59 22.5	+1.18	59 35.3	+0.94	12 53.1	2.29	16.1
8	16 18.6	16 20.5	59 45.1	0.70	59 52.0	+0.45	13 50.2	2.46	17.1
9	16 21.6	16 21.8	59 55.9	+0.20	59 56.9	-0.03	14 50.8	2.58	18.1
10	16 21.4	16 20.2	59 55.1	-0.25	59 50.8	-0.45	15 53.5	2.62	19.1
11	16 18.4	16 16.1	59 44.3	0.62	59 35.8	0.78	16 55.7	2.55	20.1
12	16 13.3	16 10.2	59 25.6	0.91	59 14.1	1.00	17 55.3	2.41	21.1
13	16 6.8	16 3.1	59 1.6	-1.08	58 48.2	-1.14	18 51.0	2.23	22.1
14	15 59.3	15 55.4	58 34.2	1.18	58 19.9	1.21	19 42.6	2.08	23.1
15	15 51.4	15 47.4	58 5.2	1.23	57 50.4	1.24	20 30.9	1.96	24.1
16	15 43.3	15 39.3	57 35.4	-1.25	57 20.5	-1.25	21 16.9	1.88	25.1
17	15 35.2	15 31.1	57 5.5	1.25	56 50.5	1.25	22 1.6	1.85	26.1
18	15 27.0	15 23.0	56 35.6	1.24	56 20.8	1.23	22 46.1	1.87	27.1
19	15 19.0	15 15.1	56 6.2	-1.21	55 51.8	-1.18	23 31.4	1.91	28.1
20	15 11.3	15 7.6	55 37.8	1.15	55 24.2	1.11	6		29.1
21	15 4.1	15 0.7	55 11.2	1.05	54 58.9	0.99	0 18.0	1.97	0.6
22	14 57.6	14 54.8	54 47.5	-0.91	54 37.1	-0.81	1 6.1	2.04	1.6
23	14 52.3	14 50.2	54 28.0	0.70	54 20.3	0.58	1 55.6	2.09	2.6
24	14 48.5	14 47.4	54 14.2	0.43	54 9.9	-0.28	2 46.0	2.10	3.6
25	14 46.7	14 46.7	54 7.6	-0.11	54 7.3	+0.07	3 36.3	2.08	4.6
26	14 47.2	14 48.4	54 9.3	+0.26	54 13.6	0.46	4 25.7	2.03	5.6
27	14 50.2	14 52.7	54 20.3	0.67	54 29.6	0.88	5 13.7	1.96	6.6
28	14 55.9	14 59.8	54 41.3	+1.08	54 55.5	+1.29	6 0.0	1.90	7.6
29	15 4.3	15 9.5	55 12.2	1.49	55 31.2	1.68	6 45.0	1.85	8.6
30	15 15.2	15 21.5	55 52.3	1.84	56 15.4	1.99	7 29.2	1.84	9.6
31	15 28.3	15 35.3	56 40.1	+2.11	57 6.1	+2.20	8 13.5	1.86	10.6

## GREENWICH MEAN TIME

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 1.					SUNDAY 3.				
0	8 31 40.12	2.0329	N. 17 46 42.0	10.053	0	10 7 39.98	1.9836	N. 8 15 29.3	13.466
1	8 33 42.04	2.0311	17 36 36.2	10.141	1	10 9 39.00	1.9838	8 1 59.8	13.518
2	8 35 43.85	2.0292	17 26 25.1	10.228	2	10 11 38.04	1.9841	7 48 27.2	13.569
3	8 37 45.55	2.0273	17 16 8.8	10.314	3	10 13 37.09	1.9843	7 34 51.5	13.619
4	8 39 47.13	2.0254	17 5 47.4	10.399	4	10 15 36.16	1.9847	7 21 12.9	13.668
5	8 41 48.60	2.0237	16 55 20.9	10.484	5	10 17 35.25	1.9850	7 7 31.3	13.717
6	8 43 49.97	2.0219	16 44 49.3	10.569	6	10 19 34.36	1.9855	6 53 46.8	13.765
7	8 45 51.23	2.0202	16 34 12.6	10.653	7	10 21 33.51	1.9861	6 39 59.5	13.812
8	8 47 52.39	2.0184	16 23 30.9	10.736	8	10 23 32.69	1.9867	6 26 9.4	13.857
9	8 49 53.44	2.0167	16 12 44.3	10.818	9	10 25 31.91	1.9873	6 12 16.6	13.902
10	8 51 54.39	2.0150	16 1 52.8	10.899	10	10 27 31.17	1.9880	5 58 21.2	13.946
11	8 53 55.24	2.0134	15 50 56.4	10.980	11	10 29 30.47	1.9887	5 44 23.1	13.989
12	8 55 56.00	2.0118	15 39 55.2	11.060	12	10 31 29.82	1.9896	5 30 22.5	14.031
13	8 57 56.66	2.0102	15 28 49.2	11.140	13	10 33 29.22	1.9905	5 16 19.4	14.072
14	8 59 57.23	2.0087	15 17 38.4	11.219	14	10 35 28.68	1.9915	5 2 13.9	14.112
15	9 1 57.71	2.0072	15 6 22.9	11.297	15	10 37 28.20	1.9925	4 48 6.0	14.151
16	9 3 58.10	2.0058	14 55 2.8	11.374	16	10 39 27.78	1.9936	4 33 55.8	14.189
17	9 5 58.41	2.0044	14 43 38.0	11.452	17	10 41 27.43	1.9947	4 19 43.3	14.226
18	9 7 58.63	2.0030	14 32 8.6	11.528	18	10 43 27.15	1.9959	4 5 28.7	14.262
19	9 9 58.77	2.0017	14 20 34.7	11.603	19	10 45 26.94	1.9972	3 51 11.9	14.297
20	9 11 58.84	2.0005	14 8 56.2	11.678	20	10 47 26.81	1.9986	3 36 53.0	14.331
21	9 13 58.83	1.9992	13 57 13.3	11.752	21	10 49 26.77	2.0000	3 22 32.2	14.363
22	9 15 58.74	1.9980	13 45 26.0	11.825	22	10 51 26.81	2.0014	3 8 9.4	14.396
23	9 17 58.59	1.9969	N. 13 33 34.3	11.898	23	10 53 26.94	2.0030	N. 2 53 44.7	14.427
SATURDAY 2.					MONDAY 4.				
0	9 19 58.37	1.9958	N. 13 21 38.2	11.970	0	10 55 27.17	2.0046	N. 2 39 18.2	14.456
1	9 21 58.08	1.9947	13 9 37.9	12.041	1	10 57 27.49	2.0063	2 24 50.0	14.485
2	9 23 57.73	1.9937	12 57 33.3	12.112	2	10 59 27.92	2.0080	2 10 20.0	14.512
3	9 25 57.32	1.9927	12 45 24.5	12.182	3	11 1 28.45	2.0098	1 55 48.5	14.538
4	9 27 56.85	1.9917	12 33 11.5	12.251	4	11 3 29.10	2.0117	1 41 15.4	14.564
5	9 29 56.33	1.9908	12 20 54.4	12.319	5	11 5 29.86	2.0136	1 26 40.8	14.589
6	9 31 55.75	1.9900	12 8 33.2	12.387	6	11 7 30.73	2.0156	1 12 4.7	14.612
7	9 33 55.13	1.9892	11 56 8.0	12.453	7	11 9 31.73	2.0177	0 57 27.3	14.634
8	9 35 54.46	1.9885	11 43 38.8	12.519	8	11 11 32.86	2.0199	0 42 48.6	14.655
9	9 37 53.75	1.9878	11 31 5.7	12.584	9	11 13 34.12	2.0222	0 28 8.7	14.674
10	9 39 53.00	1.9872	11 18 28.7	12.648	10	11 15 35.52	2.0244	N. 0 13 27.7	14.693
11	9 41 52.21	1.9865	11 5 47.9	12.712	11	11 17 37.05	2.0268	S. 0 1 14.5	14.711
12	9 43 51.38	1.9860	10 53 3.3	12.775	12	11 19 38.73	2.0292	0 15 57.6	14.727
13	9 45 50.53	1.9855	10 40 14.9	12.837	13	11 21 40.56	2.0317	0 30 41.7	14.742
14	9 47 49.64	1.9850	10 27 22.8	12.898	14	11 23 42.53	2.0342	0 45 26.6	14.755
15	9 49 48.73	1.9847	10 14 27.1	12.958	15	11 25 44.67	2.0369	1 0 12.3	14.767
16	9 51 47.80	1.9843	10 1 27.8	13.018	16	11 27 46.96	2.0396	1 14 58.7	14.779
17	9 53 46.85	1.9841	9 48 24.9	13.077	17	11 29 49.42	2.0423	1 29 45.8	14.789
18	9 55 45.89	1.9839	9 35 18.5	13.135	18	11 31 52.04	2.0452	1 44 33.4	14.797
19	9 57 44.92	1.9837	9 22 8.7	13.192	19	11 33 54.84	2.0482	1 59 21.5	14.805
20	9 59 43.94	1.9836	9 8 55.4	13.249	20	11 35 57.82	2.0511	2 14 10.0	14.812
21	10 1 42.95	1.9835	8 55 38.8	13.304	21	11 38 0.97	2.0541	2 28 58.9	14.817
22	10 3 41.96	1.9835	8 42 18.9	13.359	22	11 40 4.31	2.0572	2 43 48.0	14.820
23	10 5 40.97	1.9835	8 28 55.7	13.413	23	11 42 7.84	2.0605	2 58 37.3	14.822
24	10 7 39.98	1.9836	N. 8 15 29.3	13.465	24	11 44 11.57	2.0637	S. 3 13 26.6	14.822

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 5.					THURSDAY 7.				
0	11 44 11.57	2.0637	S. 3 13 26.6	14.822	0	13 28 14.97	2.2946	S. 14 38 9.0	13.092
1	11 46 15.49	2.0670	3 28 16.0	14.822	1	13 30 32.83	2.3007	14 51 12.2	13.014
2	11 48 19.61	2.0704	3 43 5.3	14.821	2	13 32 51.05	2.3068	15 4 10.7	12.935
3	11 50 23.94	2.0738	3 57 54.5	14.818	3	13 35 9.64	2.3129	15 17 4.4	12.854
4	11 52 28.47	2.0773	4 12 43.5	14.813	4	13 37 28.60	2.3191	15 29 53.2	12.772
5	11 54 33.22	2.0810	4 27 32.1	14.807	5	13 39 47.93	2.3254	15 42 37.0	12.687
6	11 56 38.19	2.0847	4 42 20.4	14.801	6	13 42 7.63	2.3314	15 55 15.7	12.601
7	11 58 43.38	2.0884	4 57 8.2	14.792	7	13 44 27.70	2.3376	16 7 49.1	12.512
8	12 0 48.80	2.0922	5 11 55.4	14.782	8	13 46 48.14	2.3438	16 20 17.2	12.423
9	12 2 54.45	2.0961	5 26 42.0	14.770	9	13 49 8.96	2.3502	16 32 39.9	12.332
10	12 5 0.33	2.1000	5 41 27.8	14.757	10	13 51 30.16	2.3564	16 44 57.0	12.238
11	12 7 6.45	2.1040	5 56 12.8	14.742	11	13 53 51.73	2.3627	16 57 8.5	12.142
12	12 9 12.81	2.1081	6 10 56.9	14.727	12	13 56 13.68	2.3690	17 9 14.1	12.045
13	12 11 19.42	2.1123	6 25 40.0	14.710	13	13 58 36.01	2.3753	17 21 13.9	11.947
14	12 13 26.28	2.1165	6 40 22.1	14.692	14	14 0 58.72	2.3817	17 33 7.7	11.847
15	12 15 33.40	2.1207	6 55 3.0	14.671	15	14 3 21.81	2.3880	17 44 55.5	11.744
16	12 17 40.77	2.1251	7 9 42.6	14.648	16	14 5 45.28	2.3943	17 56 37.0	11.640
17	12 19 48.41	2.1295	7 24 20.8	14.625	17	14 8 9.13	2.4007	18 8 12.3	11.534
18	12 21 56.31	2.1339	7 38 57.6	14.601	18	14 10 33.36	2.4069	18 19 41.1	11.425
19	12 24 4.48	2.1385	7 53 32.9	14.575	19	14 12 57.96	2.4133	18 31 3.3	11.316
20	12 26 12.93	2.1431	8 8 6.6	14.547	20	14 15 22.95	2.4197	18 42 19.0	11.205
21	12 28 21.65	2.1477	8 22 38.5	14.517	21	14 17 48.32	2.4259	18 53 27.9	11.092
22	12 30 30.65	2.1524	8 37 8.6	14.486	22	14 20 14.06	2.4321	19 4 30.0	10.977
23	12 32 39.94	2.1573	S. 8 51 36.8	14.452	23	14 22 40.17	2.4383	S. 19 15 25.1	10.859
WEDNESDAY 6.					FRIDAY 8.				
0	12 34 49.53	2.1622	S. 9 6 2.9	14.418	0	14 25 6.66	2.4446	S. 19 26 13.1	10.741
1	12 36 59.40	2.1670	9 20 27.0	14.382	1	14 27 33.52	2.4508	19 36 54.0	10.621
2	12 39 9.57	2.1720	9 34 48.8	14.345	2	14 30 0.76	2.4571	19 47 27.6	10.498
3	12 41 20.04	2.1771	9 49 8.4	14.307	3	14 32 28.37	2.4633	19 57 53.8	10.374
4	12 43 30.82	2.1822	10 3 25.6	14.265	4	14 34 56.35	2.4694	20 8 12.5	10.248
5	12 45 41.90	2.1873	10 17 40.2	14.223	5	14 37 24.70	2.4755	20 18 23.6	10.122
6	12 47 53.29	2.1924	10 31 52.3	14.179	6	14 39 53.41	2.4815	20 28 27.1	9.993
7	12 50 4.99	2.1977	10 46 1.7	14.133	7	14 42 22.48	2.4876	20 38 22.7	9.862
8	12 52 17.02	2.2031	11 0 8.2	14.085	8	14 44 51.92	2.4936	20 48 10.5	9.730
9	12 54 29.36	2.2084	11 14 11.9	14.037	9	14 47 21.71	2.4995	20 57 50.3	9.595
10	12 56 42.03	2.2138	11 28 12.6	13.985	10	14 49 51.86	2.5054	21 7 21.9	9.459
11	12 58 55.02	2.2193	11 42 10.1	13.932	11	14 52 22.36	2.5113	21 16 45.4	9.322
12	13 1 8.34	2.2248	11 56 4.5	13.878	12	14 54 53.21	2.5171	21 26 0.6	9.183
13	13 3 22.00	2.2304	12 9 55.5	13.822	13	14 57 24.41	2.5228	21 35 7.4	9.043
14	13 5 35.99	2.2360	12 23 43.2	13.765	14	14 59 55.95	2.5285	21 44 5.8	8.902
15	13 7 50.32	2.2417	12 37 27.3	13.705	15	15 2 27.83	2.5341	21 52 55.6	8.758
16	13 10 4.99	2.2474	12 51 7.8	13.644	16	15 5 0.04	2.5397	22 1 36.7	8.612
17	13 12 20.01	2.2532	13 4 44.6	13.582	17	15 7 32.59	2.5452	22 10 9.1	8.466
18	13 14 35.37	2.2589	13 18 17.6	13.517	18	15 10 5.46	2.5505	22 18 32.6	8.317
19	13 16 51.08	2.2648	13 31 46.6	13.450	19	15 12 38.65	2.5558	22 26 47.2	8.168
20	13 19 7.15	2.2707	13 45 11.6	13.382	20	15 15 12.16	2.5611	22 34 58.8	8.017
21	13 21 23.57	2.2767	13 58 32.4	13.312	21	15 17 45.98	2.5663	22 42 49.2	7.864
22	13 23 40.35	2.2826	14 11 49.0	13.240	22	15 20 20.11	2.5713	22 50 36.5	7.711
23	13 25 57.48	2.2885	14 25 1.2	13.167	23	15 22 54.54	2.5763	22 58 14.5	7.555
24	13 28 14.97	2.2946	S. 14 38 9.0	13.092	24	15 25 29.27	2.5813	S. 23 5 43.1	7.398

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 9.					MONDAY 11.				
0	15 25 29.27	a. 5813	S. 23 5 43.1	7.398	0	17 32 42.25	a. 6637	S. 25 42 5.0	1.077
1	15 28 4.29	a. 5861	23 13 2.3	7.340	1	17 35 22.02	a. 6618	25 40 54.9	1.339
2	15 30 39.60	a. 5907	23 20 11.9	7.080	2	17 38 1.67	a. 6597	25 39 33.9	1.440
3	15 33 15.18	a. 5953	23 27 11.9	6.920	3	17 40 41.19	a. 6575	25 38 2.1	1.639
4	15 35 51.04	a. 5999	23 34 2.3	6.758	4	17 43 20.57	a. 6551	25 36 19.6	1.798
5	15 38 27.17	a. 6043	23 40 42.9	6.595	5	17 45 59.80	a. 6525	25 34 26.3	1.978
6	15 41 3.56	a. 6086	23 47 13.7	6.431	6	17 48 38.87	a. 6497	25 32 22.2	2.137
7	15 43 40.20	a. 6128	23 53 34.6	6.266	7	17 51 17.77	a. 6469	25 30 7.5	2.334
8	15 46 17.09	a. 6168	23 59 45.6	6.099	8	17 53 56.50	a. 6439	25 27 42.1	2.511
9	15 48 54.22	a. 6208	24 5 46.5	5.931	9	17 56 35.04	a. 6407	25 25 6.2	2.687
10	15 51 31.59	a. 6247	24 11 37.3	5.762	10	17 59 13.39	a. 6375	25 22 19.7	2.862
11	15 54 9.18	a. 6283	24 17 18.0	5.593	11	18 1 51.54	a. 6341	25 19 22.7	3.037
12	15 56 46.99	a. 6319	24 22 48.5	5.422	12	18 4 29.48	a. 6305	25 16 15.2	3.212
13	15 59 25.01	a. 6354	24 28 8.7	5.250	13	18 7 7.20	a. 6268	25 12 57.3	3.384
14	16 2 3.24	a. 6387	24 33 18.5	5.077	14	18 9 44.70	a. 6231	25 9 29.1	3.556
15	16 4 41.66	a. 6419	24 38 18.0	4.904	15	18 12 21.97	a. 6192	25 5 50.6	3.727
16	16 7 20.27	a. 6450	24 43 7.0	4.729	16	18 14 59.00	a. 6152	25 2 1.8	3.897
17	16 9 59.06	a. 6479	24 47 45.5	4.553	17	18 17 35.79	a. 6110	24 58 2.9	4.067
18	16 12 38.02	a. 6507	24 52 13.4	4.378	18	18 20 12.32	a. 6067	24 53 53.8	4.236
19	16 15 17.15	a. 6534	24 56 30.8	4.202	19	18 22 48.59	a. 6023	24 49 34.6	4.402
20	16 17 56.43	a. 6559	25 0 37.6	4.024	20	18 25 24.60	a. 5978	24 45 5.5	4.568
21	16 20 35.86	a. 6583	25 4 33.7	3.846	21	18 28 0.33	a. 5932	24 40 26.4	4.734
22	16 23 15.42	a. 6605	25 8 19.1	3.667	22	18 30 35.78	a. 5885	24 35 37.4	4.898
23	16 25 55.12	a. 6626	S. 25 11 53.7	3.487	23	18 33 10.95	a. 5837	S. 24 30 38.6	5.061
SUNDAY 10.					TUESDAY 12.				
0	16 28 34.93	a. 6644	S. 25 15 17.5	3.307	0	18 35 45.83	a. 5788	S. 24 25 30.1	5.222
1	16 31 14.85	a. 6662	25 18 30.5	3.127	1	18 38 20.41	a. 5737	24 20 11.9	5.383
2	16 33 54.88	a. 6679	25 21 32.7	2.945	2	18 40 54.68	a. 5687	24 14 44.1	5.543
3	16 36 35.00	a. 6693	25 24 23.9	2.763	3	18 43 28.65	a. 5635	24 9 6.8	5.701
4	16 39 15.20	a. 6706	25 27 4.3	2.582	4	18 46 2.30	a. 5582	24 3 20.0	5.857
5	16 41 55.47	a. 6717	25 29 33.8	2.400	5	18 48 35.63	a. 5528	23 57 23.9	6.012
6	16 44 35.81	a. 6727	25 31 52.3	2.217	6	18 51 8.64	a. 5474	23 51 18.5	6.167
7	16 47 16.20	a. 6736	25 33 59.8	2.034	7	18 53 41.32	a. 5419	23 45 3.8	6.321
8	16 49 56.64	a. 6743	25 35 56.4	1.852	8	18 56 13.67	a. 5363	23 38 40.0	6.473
9	16 52 37.12	a. 6748	25 37 42.0	1.668	9	18 58 45.68	a. 5307	23 32 7.1	6.623
10	16 55 17.62	a. 6752	25 39 16.6	1.485	10	19 1 17.35	a. 5249	23 25 25.2	6.772
11	16 57 58.15	a. 6755	25 40 40.2	1.301	11	19 3 48.67	a. 5190	23 18 34.5	6.919
12	17 0 38.68	a. 6755	25 41 52.7	1.117	12	19 6 19.63	a. 5131	23 11 34.9	7.066
13	17 3 19.21	a. 6755	25 42 54.2	0.933	13	19 8 50.24	a. 5072	23 4 26.6	7.211
14	17 5 59.74	a. 6753	25 43 44.7	0.750	14	19 11 20.50	a. 5013	22 57 9.6	7.354
15	17 8 40.24	a. 6748	25 44 24.2	0.566	15	19 13 50.40	a. 4952	22 49 44.1	7.496
16	17 11 20.71	a. 6742	25 44 52.6	0.382	16	19 16 19.93	a. 4892	22 42 10.1	7.637
17	17 14 1.14	a. 6734	25 45 10.1	0.199	17	19 18 49.10	a. 4831	22 34 27.7	7.776
18	17 16 41.52	a. 6725	25 45 16.5	-0.016	18	19 21 17.90	a. 4768	22 26 37.0	7.913
19	17 19 21.84	a. 6715	25 45 12.0	+0.167	19	19 23 46.32	a. 4706	22 18 38.1	8.050
20	17 22 2.10	a. 6703	25 44 56.5	0.350	20	19 26 14.37	a. 4643	22 10 31.0	8.185
21	17 24 42.28	a. 6689	25 44 30.0	0.533	21	19 28 42.04	a. 4581	22 2 15.9	8.318
22	17 27 22.37	a. 6674	25 43 52.6	0.715	22	19 31 9.34	a. 4517	21 53 52.9	8.449
23	17 30 2.37	a. 6657	25 43 4.2	0.897	23	19 33 36.25	a. 4453	21 45 22.0	8.579
24	17 32 42.25	a. 6637	S. 25 42 5.0	1.077	24	19 36 2.78	a. 4390	S. 21 36 43.4	8.707

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 13.					FRIDAY 15.				
0	19 36 2.78	2.4390	S. 21 36 43.4	8.707	0	21 25 51.17	2.1477	S. 12 39 36.5	13.091
1	19 38 28.93	2.4326	21 27 57.1	8.835	1	21 27 59.88	2.1427	12 26 29.4	13.146
2	19 40 54.69	2.4261	21 19 3.2	8.961	2	21 30 8.29	2.1377	12 13 19.0	13.200
3	19 43 20.06	2.4197	21 10 1.8	9.085	3	21 32 16.40	2.1327	12 0 5.4	13.252
4	19 45 45.05	2.4132	21 0 53.0	9.208	4	21 34 24.21	2.1278	11 46 48.7	13.303
5	19 48 9.65	2.4067	20 51 36.9	9.329	5	21 36 31.74	2.1228	11 33 29.0	13.352
6	19 50 33.86	2.4002	20 42 13.5	9.448	6	21 38 38.99	2.1178	11 20 6.4	13.402
7	19 52 57.68	2.3938	20 32 43.1	9.566	7	21 40 45.95	2.1127	11 6 40.9	13.448
8	19 55 21.11	2.3873	20 23 5.6	9.682	8	21 42 52.64	2.1092	10 53 12.6	13.494
9	19 57 44.15	2.3808	20 13 21.2	9.798	9	21 44 59.06	2.1047	10 39 41.6	13.539
10	20 0 6.81	2.3743	20 3 20.9	9.912	10	21 47 5.21	2.1002	10 26 7.9	13.582
11	20 2 29.07	2.3677	19 53 31.8	10.023	11	21 49 11.09	2.0958	10 12 31.7	13.623
12	20 4 50.94	2.3612	19 43 27.1	10.133	12	21 51 16.71	2.0916	9 58 53.1	13.665
13	20 7 12.42	2.3548	19 33 15.8	10.242	13	21 53 22.08	2.0873	9 45 12.1	13.708
14	20 9 33.52	2.3484	19 22 58.1	10.348	14	21 55 27.19	2.0832	9 31 28.8	13.741
15	20 11 54.23	2.3419	19 12 34.0	10.455	15	21 57 32.06	2.0791	9 17 43.2	13.777
16	20 14 14.55	2.3354	19 2 3.5	10.559	16	21 59 36.68	2.0750	9 3 55.5	13.812
17	20 16 34.48	2.3290	18 51 26.9	10.662	17	22 1 41.06	2.0710	8 50 5.7	13.847
18	20 18 54.03	2.3227	18 40 44.1	10.762	18	22 3 45.20	2.0672	8 36 13.9	13.880
19	20 21 13.20	2.3162	18 29 55.4	10.861	19	22 5 49.12	2.0634	8 22 20.1	13.912
20	20 23 31.98	2.3098	18 19 0.8	10.959	20	22 7 52.81	2.0596	8 8 24.5	13.942
21	20 25 50.38	2.3035	18 8 0.3	11.056	21	22 9 56.27	2.0559	7 54 27.1	13.970
22	20 28 8.40	2.2972	17 56 54.1	11.151	22	22 11 59.52	2.0523	7 40 28.1	13.998
23	20 30 26.05	2.2910	S. 17 45 42.2	11.244	23	22 14 2.55	2.0487	S. 7 26 27.4	14.025
THURSDAY 14.					SATURDAY 16.				
0	20 32 43.32	2.2847	S. 17 34 24.8	11.335	0	22 16 5.37	2.0452	S. 7 12 25.1	14.050
1	20 35 0.21	2.2784	17 23 2.0	11.425	1	22 18 7.98	2.0418	6 58 21.4	14.074
2	20 37 16.73	2.2722	17 11 33.8	11.514	2	22 20 10.39	2.0386	6 44 16.2	14.097
3	20 39 32.88	2.2662	17 0 0.3	11.602	3	22 22 12.61	2.0353	6 30 9.7	14.118
4	20 41 48.67	2.2601	16 48 21.6	11.688	4	22 24 14.63	2.0321	6 16 2.0	14.139
5	20 44 4.09	2.2539	16 36 37.8	11.772	5	22 26 16.46	2.0290	6 1 53.0	14.159
6	20 46 19.14	2.2478	16 24 49.0	11.854	6	22 28 18.11	2.0260	5 47 42.9	14.177
7	20 48 33.83	2.2419	16 12 55.3	11.935	7	22 30 19.58	2.0231	5 33 31.8	14.193
8	20 50 48.17	2.2360	16 0 56.8	12.015	8	22 32 20.88	2.0202	5 19 19.7	14.210
9	20 53 2.15	2.2301	15 48 53.5	12.093	9	22 34 22.00	2.0173	5 5 6.6	14.225
10	20 55 15.78	2.2242	15 36 45.6	12.169	10	22 36 22.95	2.0145	4 50 52.7	14.238
11	20 57 29.05	2.2183	15 24 33.2	12.245	11	22 38 23.74	2.0119	4 36 38.1	14.250
12	20 59 41.98	2.2126	15 12 16.2	12.319	12	22 40 24.38	2.0093	4 22 22.7	14.262
13	21 1 54.56	2.2068	14 59 54.9	12.391	13	22 42 24.86	2.0067	4 8 6.7	14.272
14	21 4 6.80	2.2012	14 47 29.3	12.462	14	22 44 25.19	2.0043	3 53 50.1	14.280
15	21 6 18.71	2.1957	14 34 59.5	12.531	15	22 46 25.38	2.0019	3 39 33.1	14.287
16	21 8 30.28	2.1901	14 22 25.6	12.598	16	22 48 25.42	1.9996	3 25 15.6	14.294
17	21 10 41.52	2.1846	14 9 47.7	12.665	17	22 50 25.33	1.9974	3 10 57.8	14.299
18	21 12 52.43	2.1791	13 57 5.8	12.730	18	22 52 25.11	1.9952	2 56 39.7	14.304
19	21 15 3.01	2.1737	13 44 20.1	12.793	19	22 54 24.76	1.9931	2 42 21.3	14.307
20	21 17 13.27	2.1683	13 31 30.6	12.856	20	22 56 24.28	1.9910	2 28 2.8	14.309
21	21 19 23.21	2.1631	13 18 37.4	12.917	21	22 58 23.68	1.9891	2 13 44.2	14.311
22	21 21 32.84	2.1579	13 5 40.6	12.976	22	23 0 22.97	1.9872	1 59 25.5	14.311
23	21 23 42.16	2.1527	12 52 40.3	13.034	23	23 2 22.14	1.9853	1 45 6.9	14.309
24	21 25 51.17	2.1477	S. 12 39 36.5	13.091	24	23 4 21.21	1.9836	S. 1 30 48.4	14.307

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 17.					TUESDAY 19.				
0	h m s	"	"	"	0	h m s	"	"	"
1	23 4 21.21	1.9836	S. 1 30 48.4	14.307	1	0 38 48.23	1.9752	N. 9 33 29.9	12.987
2	23 6 20.17	1.9819	1 16 30.1	14.303	2	0 40 46.78	1.9765	9 46 27.6	12.996
3	23 8 19.04	1.9803	1 2 12.0	14.299	3	0 42 45.41	1.9777	9 59 22.2	12.884
4	23 10 17.81	1.9787	0 47 54.2	14.293	4	0 44 44.11	1.9791	10 12 13.7	12.891
5	23 12 16.49	1.9773	0 33 36.8	14.287	5	0 46 42.90	1.9805	10 25 1.9	12.776
6	23 14 15.09	1.9759	0 19 19.8	14.279	6	0 48 41.77	1.9818	10 37 46.8	12.721
7	23 16 13.60	1.9746	S. 0 5 3.3	14.271	7	0 50 40.72	1.9832	10 50 28.4	12.665
8	23 18 12.04	1.9733	N. 0 9 12.7	14.261	8	0 52 39.76	1.9847	11 3 6.6	12.608
9	23 20 10.40	1.9721	0 23 28.0	14.250	9	0 54 38.89	1.9863	11 15 41.4	12.551
10	23 22 8.69	1.9709	0 37 42.7	14.238	10	0 56 38.12	1.9879	11 28 12.7	12.498
11	23 24 6.91	1.9698	0 51 56.6	14.225	11	0 58 37.44	1.9895	11 40 40.4	12.432
12	23 26 5.07	1.9689	1 6 9.7	14.211	12	1 0 36.86	1.9911	11 53 4.5	12.371
13	23 28 3.18	1.9680	1 20 21.9	14.196	13	1 2 36.37	1.9928	12 5 24.9	12.309
14	23 30 1.23	1.9671	1 34 33.2	14.180	14	1 4 35.99	1.9946	12 17 41.6	12.247
15	23 31 59.23	1.9663	1 48 43.5	14.163	15	1 6 35.72	1.9964	12 29 54.5	12.183
16	23 33 57.19	1.9656	2 2 52.8	14.145	16	1 8 35.56	1.9982	12 42 3.6	12.119
17	23 35 55.10	1.9648	2 17 0.9	14.126	17	1 10 35.51	2.0001	12 54 8.8	12.054
18	23 37 52.97	1.9642	2 31 7.9	14.106	18	1 12 35.57	2.0019	13 6 10.1	11.988
19	23 39 50.81	1.9637	2 45 13.6	14.084	19	1 14 35.74	2.0038	13 18 7.4	11.928
20	23 41 48.62	1.9633	2 59 18.0	14.062	20	1 16 36.03	2.0058	13 30 0.7	11.864
21	23 43 46.40	1.9628	3 13 21.0	14.038	21	1 18 36.44	2.0078	13 41 49.9	11.795
22	23 45 44.16	1.9625	3 27 22.6	14.014	22	1 20 36.97	2.0098	13 53 34.9	11.721
23	23 47 41.90	1.9622	3 41 22.7	13.989	23	1 22 37.62	2.0118	14 5 15.7	11.645
24	23 49 39.63	1.9620	N. 3 55 21.3	13.965	24	1 24 38.39	2.0139	N. 14 16 52.3	11.574
MONDAY 18.					WEDNESDAY 20.				
0	h m s	"	"	"	0	h m s	"	"	"
1	23 51 37.34	1.9618	N. 4 9 18.3	13.938	1	1 26 39.29	2.0161	N. 14 28 24.6	11.502
2	23 53 35.05	1.9617	4 23 13.6	13.907	2	1 28 40.32	2.0183	14 39 52.5	11.428
3	23 55 32.75	1.9617	4 37 7.2	13.878	3	1 30 41.48	2.0205	14 51 16.0	11.355
4	23 57 30.45	1.9617	4 50 59.0	13.847	4	1 32 42.76	2.0225	15 2 35.1	11.281
5	23 59 28.16	1.9618	5 4 48.9	13.816	5	1 34 44.18	2.0248	15 13 49.7	11.205
6	0 1 25.87	1.9619	5 18 36.9	13.784	6	1 36 45.74	2.0271	15 24 59.7	11.128
7	0 3 23.59	1.9622	5 32 23.0	13.752	7	1 38 47.43	2.0293	15 36 5.1	11.051
8	0 5 21.33	1.9624	5 46 7.1	13.718	8	1 40 49.26	2.0317	15 47 5.8	10.972
9	0 7 19.08	1.9628	5 59 49.1	13.682	9	1 42 51.23	2.0339	15 58 1.8	10.893
10	0 9 16.86	1.9632	6 13 28.9	13.645	10	1 44 53.33	2.0362	16 8 53.0	10.814
11	0 11 14.66	1.9636	6 27 6.5	13.608	11	1 46 55.58	2.0387	16 19 39.5	10.734
12	0 13 12.49	1.9640	6 40 41.9	13.570	12	1 48 57.97	2.0411	16 30 21.1	10.652
13	0 15 10.34	1.9645	6 54 14.9	13.531	13	1 51 0.51	2.0435	16 40 57.7	10.569
14	0 17 8.23	1.9652	7 7 45.6	13.491	14	1 53 3.19	2.0458	16 51 29.4	10.487
15	0 19 6.16	1.9658	7 21 13.8	13.450	15	1 55 6.01	2.0482	17 1 56.1	10.402
16	0 21 4.13	1.9666	7 34 39.6	13.408	16	1 57 8.98	2.0507	17 12 17.7	10.317
17	0 23 2.15	1.9673	7 48 2.8	13.365	17	1 59 12.09	2.0532	17 22 34.2	10.232
18	0 25 0.21	1.9681	8 1 23.4	13.321	18	2 1 15.36	2.0557	17 32 45.6	10.147
19	0 26 58.32	1.9690	8 14 41.3	13.276	19	2 3 18.77	2.0581	17 42 51.8	10.059
20	0 28 56.49	1.9699	8 27 56.5	13.231	20	2 5 22.33	2.0607	17 52 52.7	9.972
21	0 30 54.71	1.9708	8 41 9.0	13.184	21	2 7 26.05	2.0632	18 2 48.4	9.883
22	0 32 52.99	1.9719	8 54 18.6	13.137	22	2 9 29.91	2.0656	18 12 38.7	9.793
23	0 34 51.34	1.9730	9 7 25.4	13.088	23	2 11 33.92	2.0682	18 22 23.6	9.703
24	0 36 49.75	1.9741	9 20 29.2	13.037	24	2 13 38.09	2.0707	18 32 3.1	9.612
	0 38 48.23	1.9752	N. 9 33 29.9	12.987		2 15 42.41	2.0732	N. 18 41 37.1	9.520



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 21.					SATURDAY 23.				
0	2 15 42.41	2.0732	N.18 41 37.1	9.320	0	3 57 57.30	2.1780	N.24 20 11.8	4.967
1	2 17 46.88	2.0757	18 51 5.5	9.427	1	4 0 8.02	2.1794	24 24 30.3	4.849
2	2 19 51.50	2.0782	19 0 28.4	9.535	2	4 2 18.83	2.1807	24 28 41.7	4.730
3	2 21 56.27	2.0808	19 9 45.7	9.641	3	4 4 29.71	2.1820	24 32 45.9	4.610
4	2 24 1.20	2.0834	19 18 57.3	9.746	4	4 6 40.67	2.1832	24 36 42.9	3.889
5	2 26 6.28	2.0859	19 28 3.2	9.851	5	4 8 51.70	2.1845	24 40 32.6	3.768
6	2 28 11.51	2.0884	19 37 3.4	8.955	6	4 11 2.81	2.1857	24 44 15.1	3.647
7	2 30 16.89	2.0910	19 45 57.8	8.857	7	4 13 13.98	2.1867	24 47 50.3	3.527
8	2 32 22.43	2.0935	19 54 46.3	8.760	8	4 15 25.21	2.1877	24 51 18.3	3.406
9	2 34 28.11	2.0960	20 3 29.0	8.662	9	4 17 36.51	2.1887	24 54 39.0	3.284
10	2 36 33.95	2.0986	20 12 5.8	8.565	10	4 19 47.86	2.1897	24 57 52.4	3.162
11	2 38 39.94	2.1011	20 20 36.6	8.468	11	4 21 59.27	2.1906	25 0 58.5	3.040
12	2 40 46.08	2.1036	20 29 1.4	8.368	12	4 24 10.73	2.1913	25 3 57.2	2.917
13	2 42 52.37	2.1061	20 37 20.2	8.262	13	4 26 22.23	2.1921	25 6 48.6	2.796
14	2 44 58.81	2.1086	20 45 32.9	8.160	14	4 28 33.78	2.1928	25 9 32.7	2.673
15	2 47 5.40	2.1110	20 53 39.4	8.057	15	4 30 45.37	2.1935	25 12 9.4	2.551
16	2 49 12.13	2.1134	21 1 39.8	7.955	16	4 32 57.00	2.1941	25 14 38.8	2.428
17	2 51 19.01	2.1159	21 9 34.0	7.852	17	4 35 8.66	2.1946	25 17 0.8	2.305
18	2 53 26.04	2.1183	21 17 22.0	7.747	18	4 37 20.35	2.1951	25 19 15.4	2.182
19	2 55 33.21	2.1207	21 25 3.6	7.642	19	4 39 32.07	2.1956	25 21 22.6	2.058
20	2 57 40.52	2.1231	21 32 39.0	7.537	20	4 41 43.82	2.1962	25 23 22.4	1.935
21	2 59 47.98	2.1255	21 40 8.0	7.431	21	4 43 55.58	2.1968	25 25 14.8	1.812
22	3 1 55.58	2.1278	21 47 30.7	7.324	22	4 46 7.36	2.1965	25 26 59.8	1.688
23	3 4 3.32	2.1301	N.21 54 46.9	7.216	23	4 48 19.16	2.1967	N.25 28 37.4	1.565
FRIDAY 22.					SUNDAY 24.				
0	3 6 11.19	2.1324	N.22 1 56.6	7.108	0	4 50 30.96	2.1967	N.25 30 7.6	1.442
1	3 8 19.21	2.1347	22 8 59.9	7.000	1	4 52 42.77	2.1968	25 31 30.4	1.317
2	3 10 27.36	2.1370	22 15 56.6	6.891	2	4 54 54.58	2.1968	25 32 45.7	1.194
3	3 12 35.65	2.1392	22 22 46.8	6.782	3	4 57 6.39	2.1968	25 33 53.7	1.071
4	3 14 44.07	2.1414	22 29 30.4	6.671	4	4 59 18.20	2.1967	25 34 54.2	0.947
5	3 16 52.62	2.1436	22 36 7.3	6.560	5	5 1 30.00	2.1966	25 35 47.3	0.823
6	3 19 1.30	2.1457	22 42 37.6	6.449	6	5 3 41.79	2.1965	25 36 33.0	0.700
7	3 21 10.11	2.1478	22 49 1.2	6.337	7	5 5 53.56	2.1961	25 37 11.3	0.577
8	3 23 19.04	2.1499	22 55 18.1	6.226	8	5 8 5.32	2.1957	25 37 42.2	0.452
9	3 25 28.10	2.1520	23 1 28.3	6.113	9	5 10 17.05	2.1953	25 38 5.6	0.328
10	3 27 37.28	2.1540	23 7 31.7	5.999	10	5 12 28.76	2.1949	25 38 21.6	0.206
11	3 29 46.58	2.1559	23 13 28.2	5.885	11	5 14 40.44	2.1943	25 38 30.3	+0.082
12	3 31 55.99	2.1578	23 19 17.9	5.772	12	5 16 52.08	2.1937	25 38 31.5	-0.042
13	3 34 5.52	2.1598	23 25 0.8	5.657	13	5 19 3.69	2.1932	25 38 25.3	0.164
14	3 36 15.17	2.1617	23 30 36.7	5.542	14	5 21 15.26	2.1925	25 38 11.8	0.287
15	3 38 24.92	2.1634	23 36 5.8	5.427	15	5 23 26.79	2.1917	25 37 50.9	0.410
16	3 40 34.78	2.1652	23 41 27.9	5.310	16	5 25 38.27	2.1910	25 37 22.6	0.532
17	3 42 44.75	2.1671	23 46 43.0	5.194	17	5 27 49.71	2.1902	25 36 47.0	0.655
18	3 44 54.83	2.1688	23 51 51.2	5.077	18	5 30 1.09	2.1892	25 36 4.0	0.778
19	3 47 5.01	2.1704	23 56 52.3	4.960	19	5 32 12.41	2.1882	25 35 13.6	0.900
20	3 49 15.28	2.1720	24 1 46.4	4.842	20	5 34 23.68	2.1872	25 34 16.0	1.022
21	3 51 25.65	2.1736	24 6 33.4	4.725	21	5 36 34.88	2.1862	25 33 11.0	1.144
22	3 53 36.11	2.1751	24 11 13.4	4.607	22	5 38 46.02	2.1851	25 31 58.7	1.266
23	3 55 46.66	2.1766	24 15 46.2	4.487	23	5 40 57.09	2.1839	25 30 39.1	1.387
24	3 57 57.30	2.1780	N.24 20 11.8	4.367	24	5 43 8.09	2.1827	N.25 29 12.2	1.509

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 25.					WEDNESDAY 27.				
0	5 43 8.09	2.1827	N.25 29 12.2	1.509	0	7 25 42.01	2.0797	N.22 3 25.2	6.903
1	5 45 19.01	2.1814	25 27 38.0	1.630	1	7 27 46.71	2.0770	21 56 28.0	7.004
2	5 47 29.86	2.1801	25 25 56.6	1.750	2	7 29 51.25	2.0743	21 49 24.7	7.105
3	5 49 40.62	2.1787	25 24 8.0	1.871	3	7 31 55.63	2.0717	21 42 15.4	7.204
4	5 51 51.30	2.1772	25 22 12.1	1.992	4	7 33 59.85	2.0690	21 35 0.2	7.303
5	5 54 1.89	2.1757	25 20 9.0	2.112	5	7 36 3.91	2.0664	21 27 39.1	7.402
6	5 56 12.39	2.1742	25 17 58.7	2.231	6	7 38 7.82	2.0638	21 20 12.0	7.500
7	5 58 22.80	2.1727	25 15 41.3	2.350	7	7 40 11.57	2.0612	21 12 39.1	7.597
8	6 0 33.11	2.1711	25 13 16.7	2.470	8	7 42 15.16	2.0585	21 5 0.3	7.695
9	6 2 43.33	2.1694	25 10 44.9	2.588	9	7 44 18.59	2.0558	20 57 15.7	7.791
10	6 4 53.44	2.1677	25 8 6.1	2.707	10	7 46 21.86	2.0532	20 49 25.4	7.887
11	6 7 3.45	2.1660	25 5 20.1	2.825	11	7 48 24.98	2.0507	20 41 29.3	7.982
12	6 9 13.36	2.1642	25 2 27.1	2.942	12	7 50 27.94	2.0481	20 33 27.6	8.076
13	6 11 23.16	2.1623	24 59 27.0	3.061	13	7 52 30.75	2.0455	20 25 20.2	8.171
14	6 13 32.84	2.1604	24 56 19.8	3.178	14	7 54 33.40	2.0429	20 17 7.1	8.265
15	6 15 42.41	2.1585	24 53 5.6	3.294	15	7 56 35.90	2.0404	20 8 48.4	8.357
16	6 17 51.86	2.1566	24 49 44.5	3.410	16	7 58 38.25	2.0378	20 0 24.2	8.449
17	6 20 1.20	2.1547	24 46 16.4	3.527	17	8 0 40.44	2.0352	19 51 54.5	8.541
18	6 22 10.42	2.1526	24 42 41.3	3.642	18	8 2 42.48	2.0327	19 43 19.3	8.632
19	6 24 19.51	2.1504	24 38 59.3	3.757	19	8 4 44.37	2.0302	19 34 38.7	8.722
20	6 26 28.47	2.1483	24 35 10.4	3.872	20	8 6 46.11	2.0276	19 25 52.6	8.813
21	6 28 37.31	2.1462	24 31 14.6	3.987	21	8 8 47.71	2.0254	19 17 1.1	8.902
22	6 30 46.02	2.1441	24 27 11.9	4.102	22	8 10 49.16	2.0229	19 8 4.3	8.991
23	6 32 54.60	2.1418	N.24 23 2.4	4.215	23	8 12 50.46	2.0204	N.18 59 2.2	9.079
TUESDAY 26.					THURSDAY 28.				
0	6 35 3.04	2.1396	N.24 18 46.1	4.328	0	8 14 51.61	2.0181	N.18 49 54.8	9.167
1	6 37 11.35	2.1373	24 14 23.0	4.441	1	8 16 52.63	2.0157	18 40 42.2	9.254
2	6 39 19.52	2.1350	24 9 53.2	4.553	2	8 18 53.50	2.0133	18 31 24.3	9.341
3	6 41 27.55	2.1327	24 5 16.6	4.666	3	8 20 54.23	2.0111	18 22 1.3	9.426
4	6 43 35.45	2.1304	24 0 33.3	4.777	4	8 22 54.83	2.0088	18 12 33.2	9.512
5	6 45 43.20	2.1280	23 55 43.4	4.887	5	8 24 55.29	2.0065	18 2 59.9	9.597
6	6 47 50.81	2.1256	23 50 46.8	4.998	6	8 26 55.62	2.0043	17 53 21.6	9.680
7	6 49 58.27	2.1232	23 45 43.6	5.108	7	8 28 55.81	2.0021	17 43 38.3	9.764
8	6 52 5.59	2.1207	23 40 33.8	5.217	8	8 30 55.87	1.9999	17 33 49.9	9.847
9	6 54 12.76	2.1183	23 35 17.5	5.327	9	8 32 55.80	1.9978	17 23 56.6	9.929
10	6 56 19.79	2.1158	23 29 54.6	5.436	10	8 34 55.61	1.9957	17 13 58.4	10.011
11	6 58 26.66	2.1132	23 24 25.2	5.543	11	8 36 55.29	1.9936	17 3 55.3	10.092
12	7 0 33.38	2.1107	23 18 49.4	5.651	12	8 38 54.84	1.9915	16 53 47.4	10.172
13	7 2 39.95	2.1082	23 13 7.1	5.758	13	8 40 54.27	1.9895	16 43 34.7	10.252
14	7 4 46.37	2.1057	23 7 18.4	5.865	14	8 42 53.58	1.9876	16 33 17.2	10.331
15	7 6 52.64	2.1032	23 1 23.3	5.972	15	8 44 52.78	1.9857	16 22 55.0	10.410
16	7 8 58.75	2.1005	22 55 21.8	6.077	16	8 46 51.86	1.9838	16 12 28.0	10.488
17	7 11 4.70	2.0979	22 49 14.0	6.182	17	8 48 50.83	1.9819	16 1 56.4	10.565
18	7 13 10.50	2.0953	22 42 59.9	6.287	18	8 50 49.69	1.9801	15 51 20.2	10.642
19	7 15 16.14	2.0928	22 36 39.6	6.390	19	8 52 48.44	1.9783	15 40 39.4	10.717
20	7 17 21.63	2.0902	22 30 13.1	6.494	20	8 54 47.08	1.9765	15 29 54.1	10.793
21	7 19 26.96	2.0875	22 23 40.3	6.597	21	8 56 45.62	1.9748	15 19 4.2	10.869
22	7 21 32.13	2.0849	22 17 1.4	6.700	22	8 58 44.06	1.9732	15 8 9.8	10.943
23	7 23 37.15	2.0823	22 10 16.3	6.802	23	9 0 42.40	1.9716	14 57 11.0	11.016
24	7 25 42.01	2.0797	N.22 3 25.2	6.903	24	9 2 40.65	1.9700	N.14 46 7.9	11.088

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 29.					SUNDAY, MAY 1, 1898.				
0	9 2 40.65	1.9700	N. 14 46 7.9	11.088	0	10 36 24.47	1.9582	N. 4 42 19.1	13.798
1	9 4 38.80	1.9684	14 35 0.4	11.162	PHASES OF THE MOON.				
2	9 6 36.86	1.9669	14 23 48.5	11.233					
3	9 8 34.83	1.9655	14 12 32.4	11.304					
4	9 10 32.72	1.9642	14 1 12.0	11.375					
5	9 12 30.53	1.9628	13 49 47.4	11.445					
6	9 14 28.26	1.9615	13 38 18.6	11.514					
7	9 16 25.91	1.9602	13 26 45.7	11.582					
8	9 18 23.48	1.9589	13 15 8.7	11.651					
9	9 20 20.98	1.9578	13 3 27.6	11.718					
10	9 22 18.42	1.9567	12 51 42.5	11.784					
11	9 24 15.79	1.9557	12 39 53.5	11.850	☾ Full Moon . . . . April 6 9 19.6 ☾ Last Quarter . . . . 13 2 28.4 ● New Moon . . . . . 20 10 20.7 ☾ First Quarter . . . . . 28 14 4.7				
12	9 26 13.10	1.9547	12 28 0.5	11.916					
13	9 28 10.35	1.9537	12 16 3.6	11.980					
14	9 30 7.55	1.9528	12 4 2.9	12.044					
15	9 32 4.69	1.9520	11 51 58.3	12.108					
16	9 34 1.79	1.9513	11 39 49.9	12.171					
17	9 35 58.84	1.9505	11 27 37.8	12.232					
18	9 37 55.85	1.9498	11 15 22.0	12.293					
19	9 39 52.82	1.9492	11 3 2.6	12.354					
20	9 41 49.76	1.9487	10 50 39.5	12.414	☾ Perigee . . . . . April 9 10.2 ☾ Apogee . . . . . 25 7.4				
21	9 43 46.66	1.9482	10 38 12.9	12.473					
22	9 45 43.54	1.9477	10 25 42.7	12.532					
23	9 47 40.39	1.9473	N. 10 13 9.1	12.589					
SATURDAY 30.									
0	9 49 37.22	1.9470	N. 10 0 32.0	12.647					
1	9 51 34.03	1.9467	9 47 51.5	12.703					
2	9 53 30.83	1.9466	9 35 7.6	12.759					
3	9 55 27.62	1.9464	9 22 20.4	12.814					
4	9 57 24.40	1.9462	9 9 29.9	12.869					
5	9 59 21.17	1.9462	8 56 36.1	12.922					
6	10 1 17.95	1.9463	8 43 39.2	12.975					
7	10 3 14.73	1.9464	8 30 39.1	13.027					
8	10 5 11.52	1.9466	8 17 35.9	13.078					
9	10 7 8.32	1.9468	8 4 29.7	13.129					
10	10 9 5.14	1.9472	7 51 20.4	13.180					
11	10 11 1.98	1.9475	7 38 8.1	13.228					
12	10 12 58.84	1.9479	7 24 53.0	13.277					
13	10 14 55.73	1.9484	7 11 34.9	13.325					
14	10 16 52.65	1.9489	6 58 14.0	13.372					
15	10 18 49.60	1.9496	6 44 50.3	13.418					
16	10 20 46.60	1.9503	6 31 23.8	13.463					
17	10 22 43.64	1.9510	6 17 54.7	13.507					
18	10 24 40.72	1.9518	6 4 22.9	13.552					
19	10 26 37.86	1.9528	5 50 48.5	13.595					
20	10 28 35.06	1.9537	5 37 11.5	13.637					
21	10 30 32.31	1.9547	5 23 32.0	13.678					
22	10 32 29.63	1.9558	5 9 50.1	13.718					
23	10 34 27.01	1.9570	4 56 5.8	13.758					
24	10 36 24.47	1.9582	N. 4 42 19.1	13.798					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
1	SUN W.	114 2 3	3284	115 26 33	3270	116 51 19	3258	118 16 20	3243
	α Arietis W.	89 46 39	2916	91 18 37	2905	92 50 50	2892	94 23 19	2879
	Aldebaran W.	57 30 20	2975	59 1 4	2961	60 32 6	2946	62 3 27	2931
	JUPITER E.	58 47 14	2892	57 14 45	2882	55 42 3	2870	54 9 6	2859
	Spica E.	76 34 48	2906	75 2 37	2894	73 30 11	2881	71 57 28	2869
2	Aldebaran W.	69 45 1	2854	71 18 19	2838	72 51 58	2822	74 25 57	2806
	Pollux W.	27 47 16	2919	29 19 11	2892	30 51 40	2866	32 24 42	2843
	JUPITER E.	46 20 43	2801	44 46 17	2791	41 11 37	2779	41 36 42	2769
	Spica E.	64 9 39	2800	62 35 11	2785	61 0 24	2771	59 25 18	2756
	Antares E.	109 52 0	2794	108 17 24	2779	106 42 28	2763	105 7 12	2749
3	Aldebaran W.	82 21 6	2725	83 57 12	2710	85 33 39	2694	87 10 27	2678
	Pollux W.	40 17 6	2737	41 52 57	2717	43 29 14	2698	45 5 57	2678
	Spica E.	51 24 54	2681	49 47 49	2666	48 10 23	2650	46 32 36	2635
	Antares E.	97 5 53	2672	95 28 35	2656	93 50 56	2640	92 12 56	2624
	SATURN E.	101 14 58	2683	99 37 55	2666	98 0 30	2650	96 22 43	2635
4	Aldebaran W.	95 19 50	2599	96 58 46	2584	98 38 3	2569	100 17 40	2554
	Pollux W.	53 15 49	2588	54 55 1	2571	56 34 36	2553	58 14 35	2537
	Spica E.	38 18 35	2561	36 38 46	2546	34 58 37	2532	33 18 8	2519
	Antares E.	83 57 31	2545	82 17 21	2530	80 36 50	2515	78 55 57	2499
	SATURN E.	88 8 25	2555	86 28 28	2540	84 48 10	2525	83 7 31	2509
5	Pollux W.	66 40 10	2458	68 22 23	2443	70 4 57	2429	71 47 51	2414
	Regulus W.	29 37 48	2453	31 20 7	2437	33 2 49	2421	34 45 54	2405
	Antares E.	70 26 12	2425	68 43 13	2411	66 59 54	2397	65 16 15	2384
	SATURN E.	74 38 59	2436	72 56 16	2422	71 13 13	2408	69 29 50	2396
6	Pollux W.	80 27 16	2350	82 12 3	2337	83 57 8	2326	85 42 29	2315
	Regulus W.	43 26 40	2335	45 11 48	2323	46 57 14	2311	48 42 57	2300
	Antares E.	56 33 20	2321	54 47 51	2310	53 2 6	2299	51 16 5	2288
	SATURN E.	60 48 26	2336	59 3 19	2325	57 17 56	2315	55 32 19	2305
	α Aquilæ E.	108 44 32	2951	107 13 18	2928	105 41 35	2906	104 9 24	2886
7	Pollux W.	94 32 55	2270	96 19 39	2262	98 6 35	2255	99 53 41	2248
	Regulus W.	57 35 25	2251	59 22 36	2243	61 10 0	2235	62 57 36	2228
	Antares E.	42 22 19	2243	40 34 55	2235	38 47 19	2227	36 59 32	2220
	SATURN E.	46 40 58	2267	44 54 10	2261	43 7 13	2256	41 20 9	2252
	α Aquilæ E.	96 22 41	2808	94 48 24	2798	93 13 53	2788	91 39 10	2780
8	Regulus W.	71 57 59	2200	73 46 27	2195	75 35 2	2192	77 23 42	2189
	JUPITER W.	37 6 58	2226	38 54 47	2216	40 42 50	2208	42 31 5	2202
	α Aquilæ E.	83 43 34	2762	82 8 16	2763	80 33 0	2766	78 57 47	2770
	Fomalhaut E.	108 41 17	2640	107 3 16	2627	105 24 58	2616	103 46 25	2607
9	Regulus W.	86 27 55	2181	88 16 51	2180	90 5 48	2181	91 54 44	2182
	JUPITER W.	51 34 28	2180	53 23 26	2178	55 12 27	2176	57 1 30	2176
	Spica W.	32 26 3	2192	34 14 42	2190	36 3 24	2190	37 52 7	2189
	α Aquilæ E.	71 3 51	2218	69 29 46	2233	67 56 1	2251	66 22 39	2270
	Fomalhaut E.	95 31 4	2579	93 51 40	2577	92 12 14	2577	90 32 47	2577
	MARS E.	110 0 31	2432	108 17 42	2431	106 34 52	2432	104 52 3	2432

GREENWICH MEAN TIME.										
LUNAR DISTANCES.										
Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIh.	P. L. of Diff.	XXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
1	SUN	W.	119 41 38	3230	121 7 12	3216	122 33 2	3202	123 59 9	3187
	α Arietis	W.	95 56 5	2866	97 29 8	2852	99 2 28	2838	100 36 6	2824
	Aldebaran	W.	63 35 7	2916	65 7 6	2900	66 39 25	2885	68 12 3	2869
	JUPITER	E.	52 35 55	2848	51 2 29	2837	49 28 49	2825	47 54 53	2814
	Spica	E.	70 24 29	2855	68 51 13	2842	67 17 40	2828	65 43 49	2814
2	Aldebaran	W.	76 0 17	2791	77 34 57	2774	79 9 59	2758	80 45 22	2742
	Pollux	W.	33 58 14	2821	35 32 15	2798	37 6 45	2778	38 41 42	2757
	JUPITER	E.	40 1 33	2758	38 26 10	2747	36 50 33	2738	35 14 43	2729
	Spica	E.	57 49 53	2741	56 14 8	2727	54 38 4	2711	53 1 39	2696
	Antares	E.	103 31 37	2734	101 55 42	2718	100 19 26	2705	98 42 50	2687
3	Aldebaran	W.	88 47 37	2662	90 25 8	2646	92 3 1	2630	93 41 15	2615
	Pollux	W.	46 43 6	2660	48 20 40	2642	49 58 38	2624	51 37 1	2605
	Spica	E.	44 54 29	2620	43 16 1	2605	41 37 13	2590	39 58 4	2575
	Antares	E.	90 34 34	2609	88 55 51	2593	87 16 46	2577	85 37 19	2561
	SATURN	E.	94 44 35	2618	93 6 5	2602	91 27 13	2587	89 48 0	2571
4	Aldebaran	W.	101 57 38	2540	103 37 56	2525	105 18 34	2512	106 59 31	2498
	Pollux	W.	59 54 57	2520	61 35 42	2504	63 16 49	2488	64 58 19	2473
	Spica	E.	31 37 21	2505	29 56 15	2493	28 14 52	2481	26 33 12	2470
	Antares	E.	77 14 42	2484	75 33 6	2469	73 51 9	2454	72 8 51	2439
	SATURN	E.	81 26 30	2494	79 45 8	2480	78 3 26	2465	76 21 23	2450
5	Pollux	W.	73 31 6	2401	75 14 40	2387	76 58 34	2374	78 42 46	2362
	Regulus	W.	36 29 22	2390	38 13 11	2375	39 57 21	2362	41 41 51	2348
	Antares	E.	63 32 17	2371	61 48 0	2358	60 3 25	2345	58 18 31	2333
	SATURN	E.	67 46 9	2382	66 2 9	2371	64 17 52	2358	62 33 17	2347
6	Pollux	W.	87 28 6	2306	89 13 57	2296	91 0 3	2286	92 46 23	2278
	Regulus	W.	50 28 56	2289	52 15 11	2279	54 1 42	2269	55 48 27	2260
	Antares	E.	49 29 48	2279	47 43 17	2268	45 56 31	2259	44 9 31	2251
	SATURN	E.	53 46 27	2296	52 0 22	2288	50 14 5	2281	48 27 37	2273
	α Aquilæ	E.	102 36 47	2267	101 3 46	2251	99 30 24	2235	97 56 42	2221
7	Pollux	W.	101 40 57	2242	103 28 22	2237	105 15 55	2232	107 3 35	2227
	Regulus	W.	64 45 22	2221	66 33 18	2214	68 21 24	2209	70 9 38	2204
	Antares	E.	35 11 35	2214	33 23 29	2208	31 35 14	2203	29 46 51	2199
	SATURN	E.	39 32 59	2249	37 45 45	2247	35 58 27	2245	34 11 7	2245
	α Aquilæ	E.	90 4 16	2273	88 29 13	2269	86 54 4	2265	85 18 50	2263
8	Regulus	W.	79 12 26	2186	81 1 14	2184	82 50 6	2182	84 39 0	2182
	JUPITER	W.	44 19 30	2196	46 8 4	2190	47 56 46	2186	49 45 34	2182
	α Aquilæ	E.	77 22 40	2275	75 47 40	2284	74 12 51	2293	72 38 14	2304
	Fomalhaut	E.	102 7 40	2599	100 28 43	2592	98 49 37	2586	97 10 23	2583
9	Regulus	W.	93 43 39	2183	95 32 32	2184	97 21 23	2187	99 10 10	2189
	JUPITER	W.	58 50 34	2176	60 39 38	2176	62 28 42	2176	64 17 45	2178
	Spica	W.	39 40 51	2190	41 29 34	2190	43 18 17	2191	45 6 58	2192
	α Aquilæ	E.	64 49 42	2293	63 17 14	2217	61 45 17	2245	60 13 55	2276
	Fomalhaut	E.	88 53 21	2579	87 13 57	2582	85 34 37	2585	83 55 22	2591
	MARS	E.	103 9 14	2433	101 26 27	2435	99 43 42	2437	98 1 0	2439

GREENWICH MEAN TIME.									
LUNAR DISTANCES.									
Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	JUPITER W.	66 6 45	2180	67 55 42	2182	69 44 36	2186	71 33 25	2188
	Spica W.	46 55 37	2195	48 44 12	2197	50 32 44	2200	52 21 11	2204
	α Aquilæ E.	58 43 12	3010	57 13 12	3047	55 43 58	3089	54 15 35	3135
	Fomalhaut E.	82 16 15	2597	80 37 16	2605	78 58 28	2614	77 19 52	2624
	MARS E.	96 18 21	2443	94 35 47	2445	92 53 17	2450	91 10 53	2453
	α Pegasi E.	103 4 56	2343	101 19 59	2344	99 35 4	2346	97 50 12	2348
11	JUPITER W.	80 36 8	2211	82 24 19	2216	84 12 23	2222	86 0 18	2227
	Spica W.	61 21 59	2226	63 9 48	2232	64 57 28	2237	66 45 0	2243
	Fomalhaut E.	69 10 48	2693	67 33 59	2711	65 57 34	2732	64 21 36	2753
	MARS E.	82 40 29	2480	80 58 47	2486	79 17 14	2492	77 35 50	2499
	α Pegasi E.	89 7 1	2370	87 22 43	2376	85 38 34	2383	83 54 35	2390
	SUN E.	117 44 5	2547	116 3 57	2553	114 23 57	2558	112 44 4	2564
12	JUPITER W.	94 57 33	2262	96 44 29	2269	98 31 14	2277	100 17 48	2285
	Spica W.	75 40 21	2277	77 26 55	2283	79 13 19	2291	80 59 32	2298
	Antares W.	29 55 47	2272	31 42 27	2280	33 28 56	2287	35 15 14	2294
	SATURN W.	26 25 51	2344	28 10 46	2342	29 55 44	2342	31 40 43	2342
	Fomalhaut E.	56 29 37	2891	54 57 6	2925	53 25 19	2963	51 54 20	3005
	MARS E.	69 11 21	2537	67 30 59	2545	65 50 49	2554	64 10 51	2563
	α Pegasi E.	75 17 26	2433	73 34 39	2443	71 52 6	2454	70 9 48	2466
	SUN E.	104 26 55	2599	102 47 58	2606	101 9 11	2614	99 30 35	2622
13	Spica W.	89 47 52	2337	91 32 57	2345	93 17 51	2353	95 2 33	2362
	Antares W.	44 4 3	2333	45 49 15	2341	47 34 15	2349	49 19 3	2357
	SATURN W.	40 24 51	2361	42 9 22	2366	43 53 46	2372	45 38 1	2378
	MARS E.	55 54 5	2609	54 15 22	2619	52 36 53	2629	50 58 37	2640
	α Pegasi E.	61 42 37	2532	60 2 8	2547	58 22 0	2563	56 42 14	2580
	SUN E.	91 20 20	2663	89 42 51	2672	88 5 34	2681	86 28 29	2689
14	Antares W.	58 0 8	2398	59 43 45	2407	61 27 10	2415	63 10 23	2423
	SATURN W.	54 17 0	2412	56 0 18	2419	57 43 26	2426	59 26 23	2433
	MARS E.	42 50 56	2695	41 14 9	2707	39 37 38	2719	38 1 24	2732
	α Pegasi E.	48 29 43	2682	46 52 39	2707	45 16 9	2735	43 40 15	2763
	SUN E.	78 26 0	2735	76 50 6	2744	75 14 25	2753	73 38 56	2763
15	Antares W.	71 43 31	2466	73 25 32	2474	75 7 22	2482	76 49 0	2491
	SATURN W.	67 58 28	2472	69 40 20	2480	71 22 1	2488	73 3 31	2497
	SUN E.	65 44 38	2810	64 10 23	2820	62 36 21	2830	61 2 32	2839
16	Antares W.	85 14 12	2533	86 54 39	2542	88 34 54	2550	90 14 58	2559
	SATURN W.	81 28 10	2537	83 8 32	2545	84 48 42	2553	86 28 41	2562
	α Aquilæ W.	40 38 20	4141	41 47 42	4045	42 58 37	3960	44 10 56	3886
	SUN E.	53 16 34	2889	51 44 1	2899	50 11 41	2908	48 39 34	2920
17	SATURN W.	94 45 43	2604	96 24 33	2612	98 3 11	2621	99 41 38	2629
	α Aquilæ W.	50 29 5	3619	51 47 19	3581	53 6 14	3549	54 25 44	3519
	SUN E.	41 2 23	2975	39 31 39	2986	38 1 9	2998	36 30 54	3011
18	SATURN W.	107 50 55	2673	109 28 11	2682	111 5 15	2691	112 42 7	2701
	α Aquilæ W.	61 10 15	3417	62 32 12	3404	63 54 24	3393	65 16 49	3383
	SUN E.	29 3 47	3082	27 35 16	3099	26 7 5	3118	24 39 17	3136

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
10	JUPITER W.	73 22 10	2192	75 10 49	2196	76 59 22	2200	78 47 49	2206
	Spica W.	54 9 33	2208	55 57 49	2212	57 45 59	2216	59 34 3	2221
	α Aquilæ E.	52 48 8	3186	51 21 42	3242	49 56 22	3304	48 32 15	3372
	Fomalhaut E.	75 41 29	2635	74 3 22	2647	72 25 31	2661	70 47 59	2677
	MARS E.	89 28 34	2458	87 46 22	2463	86 4 17	2468	84 22 19	2474
	α Pegasi E.	96 5 23	2352	94 20 39	2355	92 36 0	2359	90 51 27	2364
11	JUPITER W.	87 48 5	2234	89 35 42	2241	91 23 9	2247	93 10 26	2254
	Spica W.	68 32 23	2249	70 19 37	2256	72 6 41	2262	73 53 36	2269
	Fomalhaut E.	62 46 6	2775	61 11 6	2801	59 36 40	2828	58 2 49	2859
	MARS E.	75 54 36	2506	74 13 31	2514	72 32 37	2522	70 51 54	2529
	α Pegasi E.	82 10 46	2398	80 27 8	2405	78 43 41	2415	77 0 27	2424
	SUN E.	111 4 20	2571	109 24 45	2577	107 45 19	2584	106 6 2	2591
12	JUPITER W.	102 4 10	2293	103 50 20	2300	105 36 19	2309	107 22 6	2317
	Spica W.	82 45 35	2306	84 31 26	2313	86 17 6	2321	88 2 35	2329
	Antares W.	37 1 22	2302	38 47 19	2309	40 33 5	2317	42 18 40	2325
	SATURN W.	33 25 42	2344	35 10 38	2348	36 55 28	2351	38 40 13	2356
	Fomalhaut E.	50 24 13	3050	48 55 2	3100	47 26 52	3153	45 59 47	3213
	MARS E.	62 31 5	2572	60 51 31	2581	59 12 10	2590	57 33 1	2599
	α Pegasi E.	68 27 47	2477	66 46 2	2490	65 4 35	2503	63 23 26	2517
	SUN E.	97 52 10	2629	96 13 55	2638	94 35 52	2646	92 58 0	2655
13	Spica W.	96 47 3	2370	98 31 21	2378	100 15 27	2387	101 59 21	2396
	Antares W.	51 3 40	2365	52 48 5	2373	54 32 18	2382	56 16 19	2390
	SATURN W.	47 22 8	2384	49 6 5	2391	50 49 53	2398	52 33 31	2404
	MARS E.	49 20 36	2650	47 42 49	2660	46 5 16	2672	44 27 58	2684
	α Pegasi E.	55 2 51	2598	53 23 53	2618	51 45 22	2638	50 7 18	2659
	SUN E.	84 51 35	2698	83 14 53	2707	81 38 23	2716	80 2 5	2726
14	Antares W.	64 53 25	2432	66 36 14	2440	68 18 52	2449	70 1 17	2457
	SATURN W.	61 9 10	2441	62 51 46	2449	64 34 11	2457	66 16 25	2465
	MARS E.	36 25 27	2746	34 49 48	2760	33 14 27	2775	31 39 26	2790
	α Pegasi E.	42 4 59	2795	40 30 25	2831	38 56 37	2869	37 23 38	2911
	SUN E.	72 3 40	2772	70 28 36	2782	68 53 44	2792	67 19 5	2801
15	Antares W.	78 30 26	2499	80 11 40	2507	81 52 43	2517	83 33 33	2525
	SATURN W.	74 44 49	2504	76 25 56	2512	78 6 52	2520	79 47 37	2529
	SUN E.	59 28 55	2849	57 55 31	2859	56 22 19	2869	54 49 20	2879
16	Antares W.	91 54 50	2566	93 34 31	2575	95 14 0	2584	96 53 17	2592
	SATURN W.	88 8 28	2570	89 48 4	2578	91 27 29	2587	93 6 42	2596
	α Aquilæ W.	45 24 30	3820	46 39 12	3760	47 54 56	3708	49 11 35	3660
	SUN E.	47 7 41	2931	45 36 1	2941	44 4 34	2952	42 33 21	2964
17	SATURN W.	101 19 53	2638	102 57 56	2646	104 35 48	2656	106 13 27	2664
	α Aquilæ W.	55 45 47	3493	57 6 19	3471	58 27 16	3450	59 48 36	3433
	SUN E.	35 0 55	3024	33 31 12	3038	32 1 46	3052	30 32 37	3067
18	SATURN W.	114 18 46	2709	115 55 14	2719	117 31 29	2728	119 7 32	2738
	α Aquilæ W.	66 39 25	3375	68 2 10	3369	69 25 2	3364	70 48 0	3359
	SUN E.	23 11 53	3160	21 44 56	3186	20 18 30	3214	18 52 38	3247

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
22	SUN	W.	18 24 14	3463	19 45 19	3452	21 6 37	3444	22 28 4	3438
	Pollux	E.	61 17 4	2983	59 46 30	2993	58 16 8	3001	56 45 57	3020
	Regulus	E.	98 6 35	2951	96 35 21	2960	95 4 18	2967	93 33 24	2975
23	SUN	W.	29 16 9	3435	30 37 46	3437	31 59 21	3439	33 20 53	3441
	Pollux	E.	49 17 48	3055	47 48 43	3064	46 19 49	3073	44 51 6	3082
	Regulus	E.	86 1 11	3009	84 31 10	3016	83 1 17	3022	81 31 31	3028
24	SUN	W.	40 7 52	3455	41 29 6	3457	42 50 18	3461	44 11 26	3463
	VENUS	W.	23 19 6	3502	24 37 38	3508	25 56 14	3507	27 14 52	3504
	Pollux	E.	37 30 25	3130	36 2 52	3142	34 35 33	3153	33 8 27	3164
	Regulus	E.	74 4 28	3054	72 35 22	3059	71 6 22	3063	69 37 27	3066
25	SUN	W.	50 56 34	3471	52 17 30	3471	53 38 26	3472	54 59 21	3471
	VENUS	W.	33 48 30	3588	35 7 17	3587	36 26 5	3587	37 44 54	3586
	Regulus	E.	62 13 55	3082	60 45 23	3083	59 16 53	3085	57 48 25	3087
	JUPITER	E.	95 35 57	3064	94 7 3	3066	92 38 12	3067	91 9 22	3069
26	SUN	W.	61 44 5	3467	63 5 6	3464	64 26 10	3463	65 47 16	3459
	VENUS	W.	44 19 25	3575	45 38 27	3572	46 57 32	3568	48 16 41	3564
	Aldebaran	W.	30 17 54	3276	31 42 34	3259	33 7 34	3242	34 32 53	3228
	Regulus	E.	50 26 21	3087	48 57 56	3087	47 29 30	3086	46 1 3	3083
	JUPITER	E.	83 45 23	3068	82 16 34	3066	80 47 43	3065	79 18 50	3063
	Spica	E.	104 28 44	3079	103 0 9	3078	101 31 32	3076	100 2 53	3073
27	SUN	W.	72 33 50	3437	73 55 25	3431	75 17 7	3424	76 38 56	3418
	VENUS	W.	54 53 40	3539	56 13 21	3538	57 33 10	3525	58 53 6	3518
	Aldebaran	W.	41 43 33	3164	43 10 25	3153	44 37 31	3142	46 4 50	3131
	Regulus	E.	38 38 6	3070	37 9 20	3067	35 40 30	3063	34 11 35	3060
	JUPITER	E.	71 53 39	3047	70 24 24	3042	68 55 3	3038	67 25 37	3032
	Spica	E.	92 38 39	3054	91 9 33	3049	89 40 21	3043	88 11 2	3038
28	SUN	W.	83 30 7	3376	84 52 51	3366	86 15 46	3357	87 38 52	3345
	VENUS	W.	65 34 59	3474	66 55 52	3463	68 16 57	3453	69 38 14	3441
	Aldebaran	W.	53 24 48	3074	54 53 29	3062	56 22 25	3051	57 51 35	3039
	JUPITER	E.	59 56 38	3001	58 26 26	2993	56 56 4	2985	55 25 33	2977
	Spica	E.	80 42 25	3001	79 12 13	2992	77 41 50	2982	76 11 15	2973
29	SUN	W.	94 37 40	3285	96 2 9	3272	97 26 53	3259	98 51 53	3244
	VENUS	W.	76 27 59	3379	77 50 40	3365	79 13 36	3351	80 36 49	3335
	Aldebaran	W.	65 21 18	2974	66 52 3	2960	68 23 6	2946	69 54 26	2931
	Pollux	W.	23 36 1	3100	25 4 11	3064	26 33 5	3034	28 2 36	3006
	JUPITER	E.	47 50 15	2932	46 18 37	2924	44 46 48	2913	43 14 46	2904
	Spica	E.	68 35 9	2918	67 3 13	2906	65 31 2	2894	63 58 35	2881
30	SUN	W.	106 1 15	3168	107 28 3	3152	108 55 10	3134	110 22 38	3118
	VENUS	W.	87 37 23	3255	89 2 27	3239	90 27 50	3221	91 53 34	3204
	Aldebaran	W.	77 35 47	2857	79 9 1	2841	80 42 36	2825	82 16 32	2808
	Pollux	W.	35 38 4	2890	37 10 36	2868	38 43 36	2847	40 17 3	2827
	Spica	E.	56 12 3	2811	54 37 50	2796	53 3 17	2781	51 28 24	2766
	Antares	E.	101 52 34	2803	100 18 10	2788	98 43 26	2772	97 8 22	2756
	SATURN	E.	104 56 11	2801	103 21 44	2785	101 46 57	2769	100 11 49	2754



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIh.	P. L. of Diff.	XXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
22	SUN	W.	23 49 37	3436	25 11 13	3433	26 32 52	3433	27 54 31	3434
	Pollux	E.	55 15 57	3019	53 46 8	3028	52 16 30	3038	50 47 4	3046
	Regulus	E.	92 2 40	2982	90 32 5	2989	89 1 38	2996	87 31 20	3003
23	SUN	W.	34 42 23	3444	36 3 50	3446	37 25 14	3449	38 46 35	3453
	Pollux	E.	43 22 35	3091	41 54 15	3101	40 26 7	3110	38 58 10	3120
	Regulus	E.	80 1 53	3034	78 32 22	3039	77 2 58	3044	75 33 40	3049
24	SUN	W.	45 32 32	3464	46 53 36	3467	48 14 37	3469	49 35 36	3470
	VENUS	W.	28 33 33	3593	29 52 15	3591	31 10 59	3590	32 29 44	3589
	Pollux	E.	31 41 35	3178	30 14 59	3192	28 48 40	3206	27 22 38	3223
	Regulus	E.	68 8 36	3070	66 39 50	3073	65 11 8	3077	63 42 30	3079
25	SUN	W.	56 20 17	3471	57 41 13	3471	59 2 9	3471	60 23 6	3469
	VENUS	W.	39 3 44	3584	40 22 36	3582	41 41 30	3580	43 0 26	3577
	Regulus	E.	56 19 59	3087	54 51 34	3088	53 23 10	3088	51 54 46	3087
	JUPITER	E.	89 40 34	3069	88 11 46	3069	86 42 59	3069	85 14 11	3069
26	SUN	W.	67 8 26	3455	68 29 40	3452	69 50 58	3447	71 12 21	3442
	VENUS	W.	49 35 55	3560	50 55 13	3555	52 14 36	3550	53 34 5	3545
	Aldebaran	W.	35 58 29	3214	37 24 22	3200	38 50 31	3188	40 16 55	3176
	Regulus	E.	44 32 33	3082	43 4 1	3079	41 35 26	3077	40 6 48	3073
	JUPITER	E.	77 49 55	3060	76 20 57	3057	74 51 55	3054	73 22 49	3051
	Spica	E.	98 34 10	3070	97 5 24	3067	95 36 34	3063	94 7 39	3059
27	SUN	W.	78 0 52	3410	79 22 57	3402	80 45 11	3394	82 7 34	3386
	VENUS	W.	60 13 10	3516	61 33 23	3502	62 53 45	3493	64 14 17	3484
	Aldebaran	W.	47 32 22	3119	49 0 8	3109	50 28 7	3096	51 56 21	3086
	Regulus	E.	32 42 36	3056	31 13 32	3051	29 44 22	3047	28 15 7	3043
	JUPITER	E.	65 56 4	3026	64 26 24	3021	62 56 37	3014	61 26 42	3007
	Spica	E.	86 41 36	3031	85 12 2	3024	83 42 19	3017	82 12 27	3003
28	SUN	W.	89 2 11	3334	90 25 43	3323	91 49 28	3311	93 13 27	3299
	VENUS	W.	70 59 44	3430	72 21 27	3418	73 43 23	3405	75 5 34	3393
	Aldebaran	W.	59 21 0	3026	60 50 41	3014	62 20 37	3001	63 50 49	2987
	JUPITER	E.	53 54 51	2968	52 23 58	2950	50 52 55	2951	49 21 41	2942
	Spica	E.	74 40 28	2963	73 9 29	2952	71 38 16	2942	70 6 50	2930
29	SUN	W.	100 17 10	3230	101 42 44	3214	103 8 36	3199	104 34 46	3183
	VENUS	W.	82 0 20	3320	83 24 8	3305	84 48 14	3288	86 12 39	3272
	Aldebaran	W.	71 26 5	2917	72 58 2	2902	74 30 18	2887	76 2 53	2873
	Pollux	W.	29 32 41	2981	31 3 17	2957	32 34 24	2934	34 6 0	2912
	JUPITER	E.	41 42 32	2894	40 10 5	2885	38 37 27	2876	37 4 37	2866
	Spica	E.	62 25 52	2868	60 52 52	2854	59 19 34	2840	57 45 58	2825
30	SUN	W.	111 50 26	3101	113 18 35	3083	114 47 5	3065	116 15 57	3047
	VENUS	W.	93 19 39	3185	94 46 6	3168	96 12 54	3148	97 40 5	3130
	Aldebaran	W.	83 50 49	2792	85 25 28	2775	87 0 28	2759	88 35 50	2741
	Pollux	W.	41 50 56	2806	43 25 16	2786	45 0 2	2766	46 35 14	2746
	Spica	E.	49 53 11	2750	48 17 37	2735	46 41 43	2718	45 5 27	2701
	Antares	E.	95 32 57	2740	93 57 10	2724	92 21 2	2707	90 44 32	2690
	SATURN	E.	98 36 21	2738	97 0 31	2721	95 24 19	2704	93 47 44	2687

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
<i>SUN.</i>	1	<sup>h</sup> 2 <sup>m</sup> 34 <sup>s</sup> 41.88	<sup>s</sup> 9.546	<sup>°</sup> N.15 <sup>'</sup> 10 <sup>"</sup> 6.8	<sup>"</sup> +45.18	<sup>'</sup> 15 <sup>"</sup> 54.24	<sup>s</sup> 66.09	<sup>m</sup> 3 <sup>s</sup> 2.13	<sup>s</sup> 0.310
Mon.	2	2 38 31.24	9.568	15 28 3.4	44.55	15 54.01	66.17	3 9.29	0.288
Tues.	3	2 42 21.15	9.591	15 45 44.7	43.90	15 53.78	66.25	3 15.93	0.265
Wed.	4	2 46 11.60	9.614	16 3 10.4	+43.24	15 53.55	66.33	3 22.03	0.242
Thur.	5	2 50 2.60	9.637	16 20 20.2	42.57	15 53.32	66.41	3 27.56	0.219
Frid.	6	2 53 54.17	9.660	16 37 13.7	41.89	15 53.10	66.50	3 32.54	0.195
Sat.	7	2 57 46.30	9.684	16 53 50.8	+41.19	15 52.87	66.58	3 36.94	0.172
<i>SUN.</i>	8	3 1 39.01	9.708	17 10 11.0	40.48	15 52.65	66.66	3 40.78	0.148
Mon.	9	3 5 32.31	9.733	17 26 14.2	39.77	15 52.43	66.74	3 44.03	0.124
Tues.	10	3 9 26.19	9.757	17 42 0.0	+39.04	15 52.21	66.82	3 46.70	0.099
Wed.	11	3 13 20.66	9.782	17 57 28.2	38.30	15 51.99	66.90	3 48.78	0.075
Thur.	12	3 17 15.73	9.807	18 12 38.3	37.55	15 51.78	66.98	3 50.26	0.050
Frid.	13	3 21 11.39	9.832	18 27 30.2	+36.78	15 51.57	67.06	3 51.16	0.025
Sat.	14	3 25 7.65	9.857	18 42 3.6	36.00	15 51.37	67.14	3 51.46	0.000
<i>SUN.</i>	15	3 29 4.50	9.881	18 56 18.1	35.21	15 51.16	67.22	3 51.15	0.025
Mon.	16	3 33 1.94	9.905	19 10 13.4	+34.41	15 50.96	67.30	3 50.28	0.049
Tues.	17	3 36 59.96	9.929	19 23 49.4	33.59	15 50.76	67.38	3 48.82	0.073
Wed.	18	3 40 58.55	9.953	19 37 5.6	32.76	15 50.57	67.46	3 46.79	0.096
Thur.	19	3 44 57.71	9.977	19 50 1.8	+31.92	15 50.38	67.54	3 44.19	0.120
Frid.	20	3 48 57.43	10.000	20 2 37.8	31.07	15 50.20	67.62	3 41.05	0.143
Sat.	21	3 52 57.69	10.022	20 14 53.2	30.21	15 50.02	67.70	3 37.34	0.165
<i>SUN.</i>	22	3 56 58.49	10.044	20 26 47.9	+29.34	15 49.85	67.77	3 33.12	0.187
Mon.	23	4 0 59.80	10.065	20 38 21.5	28.46	15 49.68	67.84	3 28.38	0.208
Tues.	24	4 5 1.62	10.086	20 49 33.8	27.57	15 49.52	67.91	3 23.12	0.229
Wed.	25	4 9 3.94	10.107	21 0 24.7	+26.67	15 49.36	67.98	3 17.37	0.249
Thur.	26	4 13 6.74	10.126	21 10 53.8	25.76	15 49.20	68.05	3 11.16	0.269
Frid.	27	4 17 10.00	10.145	21 21 1.0	24.84	15 49.05	68.12	3 4.48	0.288
Sat.	28	4 21 13.71	10.164	21 30 46.0	+23.91	15 48.91	68.18	2 57.34	0.306
<i>SUN.</i>	29	4 25 17.86	10.182	21 40 8.6	22.98	15 48.77	68.24	2 49.77	0.324
Mon.	30	4 29 22.44	10.199	21 49 8.8	22.04	15 48.63	68.30	2 41.77	0.342
Tues.	31	4 33 27.43	10.216	21 57 46.2	21.08	15 48.49	68.36	2 33.36	0.359
Wed.	32	4 37 32.82	10.232	N.22 6 0.7	+20.12	15 48.36	68.42	2 24.55	0.375

NOTE.—The mean time of semidiameter passing may be found by subtracting 0°.18 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
<i>SUN.</i>	1	2 34 42.36	9.547	N.15 10 9.1	+45.18	3 2.15	0.310	2 37 44.51
Mon.	2	2 38 31.75	9.569	15 28 5.8	44.54	3 9.31	0.288	2 41 41.06
Tues.	3	2 42 21.68	9.591	15 45 47.1	43.89	3 15.94	0.265	2 45 37.62
Wed.	4	2 46 12.14	9.614	16 3 12.8	+43.24	3 22.04	0.242	2 49 34.18
Thur.	5	2 50 3.16	9.637	16 20 22.6	42.57	3 27.57	0.219	2 53 30.73
Frid.	6	2 53 54.74	9.661	16 37 16.2	41.89	3 32.55	0.196	2 57 27.29
Sat.	7	2 57 46.89	9.685	16 53 53.3	+41.20	3 36.95	0.172	3 1 23.84
<i>SUN.</i>	8	3 1 39.61	9.709	17 10 13.5	40.49	3 40.79	0.148	3 5 20.40
Mon.	9	3 5 32.91	9.733	17 26 16.7	39.77	3 44.04	0.124	3 9 16.95
Tues.	10	3 9 26.80	9.757	17 42 2.5	+39.04	3 46.71	0.099	3 13 13.51
Wed.	11	3 13 21.28	9.782	17 57 30.6	38.30	3 48.79	0.075	3 17 10.07
Thur.	12	3 17 16.36	9.807	18 12 40.8	37.54	3 50.26	0.050	3 21 6.62
Frid.	13	3 21 12.02	9.832	18 27 32.6	+36.77	3 51.16	0.025	3 25 3.18
Sat.	14	3 25 8.28	9.857	18 42 5.9	35.99	3 51.46	0.000	3 28 59.74
<i>SUN.</i>	15	3 29 5.14	9.881	18 56 20.4	35.20	3 51.15	0.025	3 32 56.29
Mon.	16	3 33 2.57	9.905	19 10 15.7	+34.40	3 50.28	0.049	3 36 52.85
Tues.	17	3 37 0.59	9.929	19 23 51.6	33.59	3 48.81	0.073	3 40 49.40
Wed.	18	3 40 59.18	9.953	19 37 7.7	32.76	3 46.78	0.096	3 44 45.96
Thur.	19	3 44 58.34	9.976	19 50 3.8	+31.92	3 44.18	0.120	3 48 42.52
Frid.	20	3 48 58.04	9.999	20 2 39.7	31.07	3 41.04	0.143	3 52 39.08
Sat.	21	3 52 58.30	10.022	20 14 55.1	30.21	3 37.33	0.165	3 56 35.63
<i>SUN.</i>	22	3 56 59.08	10.044	20 26 49.6	+29.34	3 33.11	0.187	4 0 32.19
Mon.	23	4 1 0.38	10.065	20 38 23.2	28.46	3 28.37	0.208	4 4 28.75
Tues.	24	4 5 2.19	10.086	20 49 35.4	27.56	3 23.11	0.229	4 8 25.30
Wed.	25	4 9 4.50	10.106	21 0 26.2	+26.66	3 17.36	0.249	4 12 21.86
Thur.	26	4 13 7.28	10.126	21 10 55.2	25.75	3 11.14	0.269	4 16 18.42
Frid.	27	4 17 10.52	10.145	21 21 2.3	24.83	3 4.46	0.288	4 20 14.98
Sat.	28	4 21 14.21	10.163	21 30 47.2	+23.91	2 57.32	0.306	4 24 11.53
<i>SUN.</i>	29	4 25 18.34	10.181	21 40 9.8	22.98	2 49.75	0.324	4 28 8.09
Mon.	30	4 29 22.90	10.198	21 49 9.8	22.03	2 41.75	0.342	4 32 4.65
Tues.	31	4 33 27.87	10.215	21 57 47.1	21.08	2 33.34	0.359	4 36 1.21
Wed.	32	4 37 33.23	10.231	N.22 6 1.6	+20.12	2 24.53	0.375	4 39 57.76

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour,  
+0.8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	121	41 6 44.7	6 13.3	145.41	— 0.59	0.0035202	+43.8	21 18 45.42
2	122	42 4 53.6	4 22.0	145.33	0.67	0.0036249	43.5	21 14 49.51
3	123	43 3 0.6	2 28.9	145.25	0.70	0.0037290	43.3	21 10 53.61
4	124	44 1 5.8	0 33.9	145.18	— 0.70	0.0038326	+43.0	21 6 57.70
5	125	44 59 9.2	58 37.2	145.11	0.68	0.0039356	42.7	21 3 1.79
6	126	45 57 10.9	56 38.8	145.04	0.63	0.0040378	42.5	20 59 5.88
7	127	46 55 11.1	54 38.8	144.97	— 0.56	0.0041396	+42.3	20 55 9.97
8	128	47 53 9.7	52 37.3	144.91	0.45	0.0042407	42.0	20 51 14.06
9	129	48 51 7.0	50 34.4	144.85	0.33	0.0043410	41.6	20 47 18.15
10	130	49 49 2.8	48 30.1	144.80	— 0.20	0.0044405	+41.2	20 43 22.24
11	131	50 46 57.3	46 24.4	144.74	— 0.06	0.0045390	40.8	20 39 26.33
12	132	51 44 50.5	44 17.5	144.69	+ 0.07	0.0046364	40.3	20 35 30.42
13	133	52 42 42.6	42 9.4	144.64	+ 0.19	0.0047325	+39.7	20 31 34.51
14	134	53 40 33.4	40 0.1	144.59	0.28	0.0048271	39.1	20 27 38.59
15	135	54 38 23.1	37 49.6	144.54	0.36	0.0049202	38.4	20 23 42.68
16	136	55 36 11.6	35 37.9	144.49	+ 0.41	0.0050116	+37.7	20 19 46.77
17	137	56 33 58.9	33 25.1	144.44	0.44	0.0051012	36.9	20 15 50.86
18	138	57 31 45.0	31 11.0	144.39	0.43	0.0051888	36.1	20 11 54.95
19	139	58 29 29.8	28 55.7	144.34	+ 0.39	0.0052742	+35.2	20 7 59.04
20	140	59 27 13.3	26 39.0	144.29	0.32	0.0053576	34.3	20 4 3.13
21	141	60 24 55.6	24 21.1	144.24	0.23	0.0054389	33.4	20 0 7.22
22	142	61 22 36.6	22 2.0	144.18	+ 0.12	0.0055179	+32.5	19 56 11.31
23	143	62 20 16.2	19 41.4	144.12	— 0.01	0.0055947	31.6	19 52 15.40
24	144	63 17 54.4	17 19.5	144.06	0.14	0.0056694	30.7	19 48 19.49
25	145	64 15 31.1	14 56.0	144.00	— 0.27	0.0057420	+29.8	19 44 23.57
26	146	65 13 6.6	12 31.3	143.94	0.39	0.0058126	29.0	19 40 27.66
27	147	66 10 40.5	10 5.0	143.88	0.51	0.0058814	28.3	19 36 31.75
28	148	67 8 13.1	7 37.5	143.82	— 0.60	0.0059484	+27.6	19 32 35.84
29	149	68 5 44.2	5 8.4	143.77	0.67	0.0060136	26.9	19 28 39.93
30	150	69 3 14.1	2 38.1	143.72	0.71	0.0060774	26.3	19 24 44.02
31	151	70 0 42.7	0 6.5	143.67	0.71	0.0061396	25.7	19 20 48.10
32	152	70 58 9.9	57 33.5	143.62	— 0.69	0.0062006	+25.1	19 16 52.19
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0.0								Diff. for 1 Hour, —9 <sup>s</sup> .8296. (Table II.)

## GREENWICH MEAN TIME.

## THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	" "	" "	" "	" "	" "	" "	h m	m	d
1	15 28.3	15 35.3	56 40.1	+2.11	57 6.1	+2.20	8 13.5	1.86	10.6
2	15 42.6	15 50.0	57 32.9	2.25	58 0.1	2.26	8 59.0	1.94	11.6
3	15 57.4	16 4.5	58 27.1	2.21	58 53.2	2.12	9 46.9	2.06	12.6
4	16 11.3	16 17.4	59 18.0	+1.98	59 40.7	+1.78	10 38.3	2.23	13.6
5	16 22.9	16 27.5	60 0.8	1.54	60 17.7	1.26	11 34.3	2.43	14.6
6	16 31.1	16 33.7	60 31.0	0.94	60 40.3	+0.60	12 34.9	2.61	15.6
7	16 35.0	16 35.3	60 45.4	+0.25	60 46.4	-0.09	13 38.9	2.71	16.6
8	16 34.5	16 32.6	60 43.3	-0.42	60 36.3	0.73	14 43.8	2.68	17.6
9	16 29.7	16 26.0	60 25.8	1.00	60 12.3	1.23	15 46.7	2.54	18.6
10	16 21.7	16 16.7	59 56.2	-1.43	59 38.0	-1.58	16 45.4	2.35	19.6
11	16 11.3	16 5.7	59 18.3	1.68	58 57.6	1.75	17 39.3	2.15	20.6
12	15 59.9	15 54.0	58 36.3	1.78	58 14.8	1.79	18 29.0	2.00	21.6
13	15 48.2	15 42.5	57 53.4	-1.76	57 32.5	-1.72	19 15.6	1.89	22.6
14	15 37.0	15 31.7	57 12.2	1.66	56 52.7	1.59	20 0.4	1.84	23.6
15	15 26.6	15 21.8	56 34.1	1.51	56 16.4	1.43	20 44.4	1.84	24.6
16	15 17.3	13 13.0	55 59.8	-1.34	55 44.2	-1.26	21 28.8	1.87	25.6
17	15 9.1	15 5.4	55 29.6	1.17	55 16.1	1.08	22 14.4	1.93	26.6
18	15 2.0	14 58.9	55 3.6	1.00	54 52.1	0.92	23 1.6	2.00	27.6
19	14 56.0	14 53.4	54 41.6	-0.83	54 32.1	-0.75	23 50.4	2.06	28.6
20	14 51.1	14 49.2	54 23.7	0.65	54 16.5	0.55	δ		29.6
21	14 47.5	14 46.2	54 10.4	0.45	54 5.6	-0.34	0 40.4	2.10	1.0
22	14 45.3	14 44.8	54 2.2	-0.22	54 0.3	-0.10	1 30.8	2.09	2.0
23	14 44.6	14 45.0	53 59.9	+0.04	54 1.3	+0.19	2 20.6	2.05	3.0
24	14 45.9	14 47.3	54 4.5	0.35	54 9.6	0.51	3 9.0	1.98	4.0
25	14 49.2	14 51.8	54 16.8	+0.69	54 26.2	+0.87	3 55.5	1.90	5.0
26	14 54.9	14 58.7	54 37.7	1.06	54 51.6	1.25	4 40.3	1.84	6.0
27	15 3.1	15 8.1	55 7.7	1.44	55 26.1	1.63	5 23.8	1.80	7.0
28	15 13.7	15 19.9	55 46.7	+1.80	56 9.3	+1.97	6 6.8	1.80	8.0
29	15 26.6	15 33.7	56 33.9	2.12	57 0.1	2.23	6 50.4	1.84	9.0
30	15 41.2	15 48.9	57 27.5	2.33	57 55.9	2.38	7 35.8	1.94	10.0
31	15 56.7	16 4.6	58 24.7	2.40	58 53.4	2.35	8 24.2	2.10	11.0
32	16 12.1	16 19.3	59 21.2	+2.25	59 47.5	+2.10	9 16.9	2.30	12.0

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 1.					TUESDAY 3.				
0	10 36 24.47	1.9582	N. 4 42 19.1	13.798	0	12 13 15.02	2.1063	S. 6 46 23.7	14.474
1	10 38 22.00	1.9596	4 28 30.1	13.835	1	12 15 21.55	2.1113	7 0 51.7	14.458
2	10 40 19.62	1.9610	4 14 38.9	13.872	2	12 17 28.38	2.1163	7 15 18.7	14.442
3	10 42 17.32	1.9624	4 0 45.5	13.908	3	12 19 35.51	2.1215	7 29 44.7	14.423
4	10 44 15.11	1.9639	3 46 49.9	13.944	4	12 21 42.96	2.1267	7 44 9.5	14.403
5	10 46 12.99	1.9655	3 32 52.2	13.978	5	12 23 50.72	2.1320	7 58 33.1	14.382
6	10 48 10.97	1.9673	3 18 52.5	14.012	6	12 25 58.80	2.1373	8 12 55.3	14.358
7	10 50 9.06	1.9691	3 4 50.8	14.045	7	12 28 7.20	2.1427	8 27 16.1	14.334
8	10 52 7.26	1.9708	2 50 47.1	14.077	8	12 30 15.93	2.1483	8 41 35.4	14.308
9	10 54 5.56	1.9727	2 36 41.6	14.107	9	12 32 25.00	2.1539	8 55 53.1	14.281
10	10 56 3.98	1.9747	2 22 34.2	14.137	10	12 34 34.40	2.1595	9 10 9.1	14.252
11	10 58 2.52	1.9767	2 8 25.1	14.166	11	12 36 44.14	2.1652	9 24 23.3	14.220
12	11 0 1.19	1.9788	1 54 14.3	14.194	12	12 38 54.22	2.1709	9 38 35.5	14.187
13	11 1 59.98	1.9810	1 40 1.8	14.222	13	12 41 4.65	2.1767	9 52 45.7	14.153
14	11 3 58.91	1.9833	1 25 47.7	14.248	14	12 43 15.43	2.1827	10 6 53.9	14.118
15	11 5 57.98	1.9857	1 11 32.0	14.273	15	12 45 26.57	2.1887	10 20 59.9	14.081
16	11 7 57.19	1.9880	0 57 14.9	14.297	16	12 47 38.07	2.1947	10 35 3.6	14.042
17	11 9 56.54	1.9905	0 42 56.4	14.320	17	12 49 49.94	2.2008	10 49 4.9	14.001
18	11 11 56.05	1.9932	0 28 36.5	14.342	18	12 52 2.17	2.2070	11 3 3.7	13.958
19	11 13 55.72	1.9958	N. 0 14 15.3	14.364	19	12 54 14.78	2.2132	11 16 59.9	13.914
20	11 15 55.55	1.9985	S. 0 0 7.2	14.384	20	12 56 27.76	2.2196	11 30 53.4	13.869
21	11 17 55.54	2.0012	0 14 30.8	14.403	21	12 58 41.13	2.2260	11 44 44.2	13.822
22	11 19 55.70	2.0041	0 28 55.5	14.421	22	13 0 54.88	2.2324	11 58 32.0	13.772
23	11 21 56.03	2.0071	S. 0 43 21.3	14.437	23	13 3 9.02	2.2388	S. 12 12 16.8	13.721
MONDAY 2.					WEDNESDAY 4.				
0	11 23 56.55	2.0102	S. 0 57 48.0	14.453	0	13 5 23.54	2.2453	S. 12 25 58.5	13.668
1	11 25 57.25	2.0133	1 12 15.7	14.468	1	13 7 38.46	2.2520	12 39 37.0	13.613
2	11 27 58.14	2.0165	1 26 44.2	14.482	2	13 9 53.78	2.2587	12 53 12.1	13.557
3	11 29 59.23	2.0197	1 41 13.5	14.494	3	13 12 9.50	2.2654	13 6 43.8	13.498
4	11 32 0.51	2.0231	1 55 43.5	14.506	4	13 14 25.63	2.2722	13 20 11.9	13.438
5	11 34 2.00	2.0265	2 10 14.2	14.517	5	13 16 42.16	2.2789	13 33 36.4	13.377
6	11 36 3.69	2.0300	2 24 45.5	14.526	6	13 18 59.10	2.2858	13 46 57.1	13.313
7	11 38 5.60	2.0336	2 39 17.3	14.533	7	13 21 16.46	2.2927	14 0 14.0	13.247
8	11 40 7.72	2.0372	2 53 49.5	14.539	8	13 23 34.23	2.2997	14 13 26.8	13.179
9	11 42 10.07	2.0410	3 8 22.0	14.545	9	13 25 52.42	2.3067	14 26 35.5	13.110
10	11 44 12.64	2.0448	3 22 54.9	14.550	10	13 28 11.03	2.3137	14 39 40.0	13.039
11	11 46 15.44	2.0487	3 37 28.0	14.553	11	13 30 30.07	2.3208	14 52 40.2	12.966
12	11 48 18.48	2.0527	3 52 1.3	14.555	12	13 32 49.53	2.3279	15 5 35.9	12.891
13	11 50 21.76	2.0567	4 6 34.6	14.555	13	13 35 9.42	2.3351	15 18 27.1	12.814
14	11 52 25.28	2.0608	4 21 7.9	14.555	14	13 37 29.74	2.3423	15 31 13.6	12.734
15	11 54 29.05	2.0650	4 35 41.2	14.553	15	13 39 50.49	2.3495	15 43 55.2	12.653
16	11 56 33.08	2.0693	4 50 14.3	14.550	16	13 42 11.68	2.3568	15 56 32.0	12.571
17	11 58 37.37	2.0737	5 4 47.2	14.545	17	13 44 33.31	2.3641	16 9 3.7	12.486
18	12 0 41.92	2.0781	5 19 19.7	14.538	18	13 46 55.37	2.3713	16 21 30.3	12.399
19	12 2 46.74	2.0826	5 33 51.8	14.532	19	13 49 17.87	2.3787	16 33 51.6	12.310
20	12 4 51.83	2.0872	5 48 23.5	14.523	20	13 51 40.81	2.3860	16 46 7.5	12.219
21	12 6 57.20	2.0918	6 2 54.6	14.513	21	13 54 4.19	2.3934	16 58 17.9	12.127
22	12 9 2.85	2.0966	6 17 25.1	14.502	22	13 56 28.02	2.4008	17 10 22.7	12.032
23	12 11 8.79	2.1014	6 31 54.8	14.488	23	13 58 52.29	2.4082	17 22 21.7	11.934
24	12 13 15.02	2.1063	S. 6 46 23.7	14.474	24	14 1 17.00	2.4156	S. 17 34 14.8	11.836

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 5.					SATURDAY 7.				
0	14 1 17.00	2.4156	S. 17 34 14.8	11.836	0	16 5 11.22	2.7182	S. 24 31 41.4	4.880
1	14 3 42.16	2.4230	17 46 2.0	11.736	1	16 7 54.43	2.7220	24 36 28.7	4.697
2	14 6 7.76	2.4304	17 57 43.1	11.632	2	16 10 37.86	2.7255	24 41 5.0	4.513
3	14 8 33.81	2.4379	18 9 17.9	11.527	3	16 13 21.49	2.7288	24 45 30.3	4.328
4	14 11 0.31	2.4453	18 20 46.4	11.421	4	16 16 5.32	2.7321	24 49 44.4	4.143
5	14 13 27.25	2.4527	18 32 8.4	11.312	5	16 18 49.34	2.7352	24 53 47.4	3.956
6	14 15 54.63	2.4601	18 43 23.8	11.201	6	16 21 33.54	2.7381	24 57 39.1	3.767
7	14 18 22.46	2.4675	18 54 32.5	11.088	7	16 24 17.91	2.7407	25 1 19.5	3.579
8	14 20 50.73	2.4749	19 5 34.4	10.973	8	16 27 2.43	2.7433	25 4 48.6	3.390
9	14 23 19.45	2.4823	19 16 29.3	10.856	9	16 29 47.10	2.7457	25 8 6.3	3.200
10	14 25 48.61	2.4897	19 27 17.1	10.737	10	16 32 31.91	2.7478	25 11 12.6	3.010
11	14 28 18.21	2.4969	19 37 57.8	10.617	11	16 35 16.84	2.7498	25 14 7.5	2.819
12	14 30 48.24	2.5042	19 48 31.1	10.493	12	16 38 1.89	2.7517	25 16 50.9	2.627
13	14 33 18.71	2.5115	19 58 57.0	10.369	13	16 40 47.04	2.7533	25 19 22.7	2.434
14	14 35 49.62	2.5187	20 9 15.4	10.243	14	16 43 32.28	2.7547	25 21 43.0	2.242
15	14 38 20.96	2.5260	20 19 26.1	10.113	15	16 46 17.60	2.7559	25 23 51.7	2.048
16	14 40 52.74	2.5332	20 29 29.0	9.982	16	16 49 2.99	2.7570	25 25 48.8	1.855
17	14 43 24.94	2.5402	20 39 24.0	9.850	17	16 51 48.44	2.7578	25 27 34.3	1.662
18	14 45 57.56	2.5472	20 49 11.0	9.716	18	16 54 33.93	2.7584	25 29 8.2	1.467
19	14 48 30.61	2.5543	20 58 49.9	9.579	19	16 57 19.45	2.7589	25 30 30.4	1.273
20	14 51 4.08	2.5612	21 8 20.5	9.441	20	17 0 5.00	2.7592	25 31 41.0	1.079
21	14 53 37.96	2.5682	21 17 42.8	9.301	21	17 2 50.56	2.7594	25 32 39.9	0.884
22	14 56 12.26	2.5751	21 26 56.6	9.158	22	17 5 36.13	2.7593	25 33 27.1	0.690
23	14 58 46.97	2.5818	S. 21 36 1.8	9.014	23	17 8 21.68	2.7589	S. 25 34 2.7	0.496
FRIDAY 6.					SUNDAY 8.				
0	15 1 22.08	2.5885	S. 21 44 58.3	8.868	0	17 11 7.20	2.7584	S. 25 34 26.6	0.301
1	15 3 57.59	2.5951	21 53 46.0	8.721	1	17 13 52.69	2.7578	25 34 38.8	- 0.107
2	15 6 33.49	2.6017	22 2 24.8	8.572	2	17 16 38.14	2.7569	25 34 39.4	+ 0.087
3	15 9 9.79	2.6082	22 10 54.6	8.420	3	17 19 23.52	2.7558	25 34 28.3	0.282
4	15 11 46.47	2.6145	22 19 15.2	8.267	4	17 22 8.84	2.7547	25 34 5.6	0.475
5	15 14 23.53	2.6208	22 27 26.6	8.112	5	17 24 54.08	2.7533	25 33 31.3	0.668
6	15 17 0.97	2.6270	22 35 28.7	7.956	6	17 27 39.23	2.7516	25 32 45.4	0.861
7	15 19 38.77	2.6331	22 43 21.3	7.797	7	17 30 24.27	2.7497	25 31 48.0	1.053
8	15 22 16.94	2.6391	22 51 4.4	7.637	8	17 33 9.20	2.7477	25 30 39.0	1.245
9	15 24 55.46	2.6450	22 58 37.8	7.477	9	17 35 54.00	2.7456	25 29 18.6	1.437
10	15 27 34.34	2.6508	23 6 1.6	7.314	10	17 38 38.67	2.7432	25 27 46.6	1.628
11	15 30 13.56	2.6564	23 13 15.5	7.148	11	17 41 23.19	2.7407	25 26 3.2	1.819
12	15 32 53.11	2.6619	23 20 19.4	6.982	12	17 44 7.55	2.7379	25 24 8.3	2.009
13	15 35 32.99	2.6674	23 27 13.3	6.815	13	17 46 51.74	2.7351	25 22 2.1	2.198
14	15 38 13.20	2.6727	23 33 57.2	6.646	14	17 49 35.76	2.7320	25 19 44.5	2.387
15	15 40 53.72	2.6779	23 40 30.8	6.474	15	17 52 19.58	2.7287	25 17 15.7	2.573
16	15 43 34.55	2.6829	23 46 54.1	6.302	16	17 55 3.21	2.7253	25 14 35.7	2.760
17	15 46 15.67	2.6878	23 53 7.1	6.130	17	17 57 46.62	2.7217	25 11 44.5	2.947
18	15 48 57.09	2.6927	23 59 9.7	5.955	18	18 0 29.82	2.7180	25 8 42.1	3.132
19	15 51 38.79	2.6973	24 5 1.7	5.778	19	18 3 12.78	2.7141	25 5 28.7	3.315
20	15 54 20.77	2.7018	24 10 43.1	5.602	20	18 5 55.51	2.7101	25 2 4.3	3.498
21	15 57 3.01	2.7061	24 16 13.9	5.423	21	18 8 37.99	2.7058	24 58 28.9	3.681
22	15 59 45.50	2.7102	24 21 33.9	5.243	22	18 11 20.21	2.7015	24 54 42.6	3.862
23	16 2 28.24	2.7143	24 26 43.1	5.062	23	18 14 2.17	2.6971	24 50 45.5	4.041
24	16 5 11.22	2.7182	S. 24 31 41.4	4.880	24	18 16 43.86	2.6924	S. 24 46 37.7	4.219

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 9.					WEDNESDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	18 16 43.86	2.6924	S. 24 46 37.7	4.219	1	20 18 41.04	2.3682	S. 18 26 9.5	10.988
2	18 19 25.26	2.6875	24 42 19.2	4.397	2	20 21 2.91	2.3607	18 15 7.2	11.087
3	18 22 6.36	2.6825	24 37 50.0	4.574	3	20 23 24.33	2.3533	18 3 59.1	11.182
4	18 24 47.16	2.6775	24 33 10.3	4.749	4	20 25 45.31	2.3460	17 52 45.3	11.277
5	18 27 27.66	2.6723	24 28 20.1	4.923	5	20 28 5.85	2.3387	17 41 25.8	11.371
6	18 30 7.84	2.6669	24 23 19.5	5.096	6	20 30 25.95	2.3314	17 30 0.8	11.462
7	18 32 47.69	2.6614	24 18 8.6	5.267	7	20 32 45.62	2.3242	17 18 30.3	11.552
8	18 35 27.21	2.6558	24 12 47.5	5.437	8	20 35 4.86	2.3171	17 6 54.5	11.640
9	18 38 6.39	2.6502	24 7 16.2	5.606	9	20 37 23.67	2.3099	16 55 13.5	11.727
10	18 40 45.23	2.6443	24 1 34.8	5.772	10	20 39 42.05	2.3027	16 43 27.3	11.812
11	18 43 23.71	2.6384	23 55 43.5	5.937	11	20 42 0.00	2.2957	16 31 36.1	11.895
12	18 46 1.84	2.6324	23 49 42.3	6.102	12	20 44 17.53	2.2886	16 19 39.9	11.977
13	18 48 39.60	2.6262	23 43 31.3	6.264	13	20 46 34.63	2.2816	16 7 38.9	12.055
14	18 51 16.99	2.6200	23 37 10.6	6.425	14	20 48 51.32	2.2747	15 55 33.3	12.132
15	18 53 54.00	2.6136	23 30 40.3	6.584	15	20 51 7.60	2.2678	15 43 23.0	12.209
16	18 56 30.62	2.6072	23 24 0.5	6.742	16	20 53 23.46	2.2609	15 31 8.2	12.283
17	18 59 6.86	2.6007	23 17 11.2	6.899	17	20 55 38.91	2.2542	15 18 49.0	12.356
18	19 1 42.70	2.5940	23 10 12.6	7.053	18	20 57 53.96	2.2475	15 6 25.5	12.427
19	19 4 18.14	2.5874	23 3 4.8	7.207	19	21 0 8.61	2.2408	14 53 57.7	12.497
20	19 6 53.19	2.5807	22 55 47.8	7.358	20	21 2 22.86	2.2342	14 41 25.8	12.565
21	19 9 27.82	2.5738	22 48 21.8	7.508	21	21 4 36.71	2.2276	14 28 49.9	12.632
22	19 12 2.04	2.5669	22 40 46.9	7.655	22	21 6 50.17	2.2211	14 16 10.0	12.697
23	19 14 35.85	2.5600	22 33 3.2	7.802	23	21 9 3.24	2.2147	14 3 26.3	12.760
24	19 17 9.24	2.5529	S. 22 25 10.7	7.947	24	21 11 15.93	2.2083	S. 13 50 38.8	12.822
TUESDAY 10.					THURSDAY 12.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	19 19 42.20	2.5458	S. 22 17 9.5	8.090	1	21 13 28.24	2.2020	S. 13 37 47.7	12.882
2	19 22 14.73	2.5387	22 8 59.9	8.231	2	21 15 40.17	2.1958	13 24 53.0	12.941
3	19 24 46.84	2.5316	22 0 41.8	8.371	3	21 17 51.73	2.1897	13 11 54.8	12.997
4	19 27 18.52	2.5243	21 52 15.4	8.508	4	21 20 2.93	2.1836	12 58 53.3	13.053
5	19 29 49.76	2.5170	21 43 40.9	8.643	5	21 22 13.76	2.1775	12 45 48.5	13.107
6	19 32 20.56	2.5097	21 34 58.2	8.778	6	21 24 24.23	2.1715	12 32 40.4	13.161
7	19 34 50.93	2.5024	21 26 7.5	8.911	7	21 26 34.34	2.1656	12 19 29.2	13.212
8	19 37 20.85	2.4950	21 17 8.9	9.042	8	21 28 44.10	2.1598	12 6 15.0	13.261
9	19 39 50.33	2.4876	21 8 2.5	9.171	9	21 30 53.52	2.1541	11 52 57.9	13.309
10	19 42 19.36	2.4802	20 58 48.4	9.297	10	21 33 2.59	2.1483	11 39 37.9	13.356
11	19 44 47.95	2.4727	20 49 26.8	9.422	11	21 35 11.32	2.1427	11 26 15.2	13.401
12	19 47 16.09	2.4652	20 39 57.7	9.546	12	21 37 19.72	2.1372	11 12 49.8	13.445
13	19 49 43.78	2.4577	20 30 21.3	9.669	13	21 39 27.78	2.1317	10 59 21.8	13.487
14	19 52 11.02	2.4502	20 20 37.6	9.797	14	21 41 35.52	2.1263	10 45 51.3	13.529
15	19 54 37.81	2.4428	20 10 46.8	9.905	15	21 43 42.94	2.1211	10 32 18.3	13.569
16	19 57 4.16	2.4353	20 0 49.0	10.022	16	21 45 50.05	2.1158	10 18 43.0	13.607
17	19 59 30.05	2.4278	19 50 44.2	10.137	17	21 47 56.84	2.1107	10 5 5.4	13.644
18	20 1 55.50	2.4204	19 40 32.6	10.249	18	21 50 3.33	2.1056	9 51 25.7	13.680
19	20 4 20.50	2.4128	19 30 14.3	10.360	19	21 52 9.51	2.1006	9 37 43.8	13.715
20	20 6 45.04	2.4052	19 19 49.4	10.469	20	21 54 15.40	2.0957	9 23 59.9	13.747
21	20 9 9.13	2.3978	19 9 18.0	10.577	21	21 56 20.99	2.0908	9 10 14.1	13.779
22	20 11 32.78	2.3904	18 58 40.2	10.683	22	21 58 26.29	2.0860	8 56 26.4	13.810
23	20 13 55.98	2.3829	18 47 56.1	10.787	23	22 0 31.31	2.0813	8 42 36.9	13.839
24	20 16 18.73	2.3755	18 37 5.8	10.888	24	22 2 36.05	2.0767	8 28 45.7	13.867
	20 18 41.04	2.3682	S. 18 26 9.5	10.988		22 4 40.51	2.0722	S. 8 14 52.8	13.894



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 13.					SUNDAY 15.				
0	22 4 40.51	2.0728	S. 8 14 52.8	13.894	0	23 40 26.17	1.9478	N. 3 0 54.7	13.862
1	22 6 44.71	2.0677	8 0 58.4	13.919	1	23 42 23.02	1.9472	3 14 45.7	13.837
2	22 8 48.64	2.0633	7 47 2.5	13.943	2	23 44 19.83	1.9465	3 28 35.1	13.811
3	22 10 52.31	2.0590	7 33 5.2	13.967	3	23 46 16.60	1.9459	3 42 23.0	13.784
4	22 12 55.72	2.0548	7 19 6.5	13.988	4	23 48 13.34	1.9454	3 56 9.2	13.756
5	22 14 58.89	2.0507	7 5 6.6	14.008	5	23 50 10.05	1.9449	4 9 53.7	13.727
6	22 17 1.81	2.0467	6 51 5.5	14.027	6	23 52 6.73	1.9445	4 23 36.4	13.697
7	22 19 4.49	2.0427	6 37 3.3	14.046	7	23 54 3.39	1.9443	4 37 17.4	13.668
8	22 21 6.93	2.0388	6 23 0.0	14.063	8	23 56 0.04	1.9441	4 50 56.6	13.637
9	22 23 9.14	2.0350	6 8 55.8	14.078	9	23 57 56.68	1.9438	5 4 33.8	13.603
10	22 25 11.13	2.0313	5 54 50.6	14.093	10	23 59 53.30	1.9437	5 18 9.0	13.570
11	22 27 12.90	2.0277	5 40 44.6	14.106	11	0 1 49.92	1.9437	5 31 42.2	13.537
12	22 29 14.45	2.0241	5 26 37.9	14.118	12	0 3 46.54	1.9437	5 45 13.4	13.508
13	22 31 15.79	2.0206	5 12 30.4	14.130	13	0 5 43.16	1.9437	5 58 42.5	13.467
14	22 33 16.92	2.0171	4 58 22.3	14.139	14	0 7 39.79	1.9439	6 12 9.4	13.429
15	22 35 17.84	2.0138	4 44 13.7	14.148	15	0 9 36.43	1.9442	6 25 34.0	13.392
16	22 37 18.57	2.0106	4 30 4.6	14.156	16	0 11 33.09	1.9444	6 38 56.4	13.354
17	22 39 19.11	2.0074	4 15 55.0	14.163	17	0 13 29.76	1.9447	6 52 16.5	13.315
18	22 41 19.46	2.0043	4 1 45.1	14.168	18	0 15 26.46	1.9452	7 5 34.2	13.275
19	22 43 19.63	2.0013	3 47 34.8	14.173	19	0 17 23.18	1.9456	7 18 49.5	13.234
20	22 45 19.62	1.9984	3 33 24.3	14.177	20	0 19 19.93	1.9462	7 32 2.3	13.192
21	22 47 19.44	1.9956	3 19 13.6	14.178	21	0 21 16.72	1.9467	7 45 12.6	13.150
22	22 49 19.09	1.9928	3 5 2.9	14.179	22	0 23 13.54	1.9473	7 58 20.3	13.106
23	22 51 18.57	1.9901	S. 2 50 52.1	14.180	23	0 25 10.40	1.9480	N. 8 11 25.3	13.062
SATURDAY 14.					MONDAY 16.				
0	22 53 17.90	1.9875	S. 2 36 41.3	14.179	0	0 27 7.30	1.9488	N. 8 24 27.7	13.017
1	22 55 17.07	1.9849	2 22 30.6	14.177	1	0 29 4.25	1.9497	8 37 27.3	12.971
2	22 57 16.09	1.9825	2 8 20.0	14.174	2	0 31 1.26	1.9506	8 50 24.2	12.924
3	22 59 14.97	1.9802	1 54 9.7	14.170	3	0 32 58.32	1.9514	9 3 18.2	12.877
4	23 1 13.71	1.9779	1 39 59.6	14.165	4	0 34 55.43	1.9524	9 16 9.4	12.828
5	23 3 12.32	1.9757	1 25 49.9	14.159	5	0 36 52.61	1.9535	9 28 57.6	12.778
6	23 5 10.79	1.9735	1 11 40.5	14.152	6	0 38 49.85	1.9545	9 41 42.8	12.728
7	23 7 9.14	1.9714	0 57 31.6	14.144	7	0 40 47.15	1.9557	9 54 25.0	12.677
8	23 9 7.36	1.9694	0 43 23.2	14.136	8	0 42 44.53	1.9569	10 7 4.1	12.626
9	23 11 5.47	1.9676	0 29 15.3	14.126	9	0 44 41.98	1.9582	10 19 40.1	12.573
10	23 13 3.47	1.9657	0 15 8.1	14.114	10	0 46 39.51	1.9595	10 32 12.9	12.519
11	23 15 1.36	1.9639	S. 0 1 1.6	14.102	11	0 48 37.12	1.9608	10 44 42.4	12.465
12	23 16 59.14	1.9622	N. 0 13 4.2	14.090	12	0 50 34.81	1.9622	10 57 8.7	12.410
13	23 18 56.83	1.9607	0 27 9.2	14.076	13	0 52 32.59	1.9637	11 9 31.6	12.354
14	23 20 54.42	1.9591	0 41 13.3	14.061	14	0 54 30.45	1.9652	11 21 51.2	12.297
15	23 22 51.92	1.9577	0 55 16.5	14.045	15	0 56 28.41	1.9667	11 34 7.3	12.239
16	23 24 49.34	1.9563	1 9 18.7	14.028	16	0 58 26.46	1.9683	11 46 19.9	12.181
17	23 26 46.68	1.9551	1 23 19.9	14.011	17	1 0 24.61	1.9700	11 58 29.0	12.122
18	23 28 43.95	1.9538	1 37 20.0	13.992	18	1 2 22.86	1.9717	12 10 34.5	12.062
19	23 30 41.14	1.9526	1 51 19.0	13.973	19	1 4 21.21	1.9734	12 22 36.4	12.001
20	23 32 38.26	1.9515	2 5 16.8	13.953	20	1 6 19.67	1.9752	12 34 34.6	11.938
21	23 34 35.32	1.9506	2 19 13.3	13.931	21	1 8 18.24	1.9770	12 46 29.0	11.876
22	23 36 32.33	1.9497	2 33 8.5	13.908	22	1 10 16.91	1.9788	12 58 19.7	11.813
23	23 38 29.28	1.9487	2 47 2.3	13.885	23	1 12 15.70	1.9807	13 10 6.6	11.748
24	23 40 26.17	1.9478	N. 3 0 54.7	13.862	24	1 14 14.60	1.9827	N. 13 21 49.5	11.682

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 17.					THURSDAY 19.				
0	1 14 14.60	1.9827	N. 13 21 49.5	11.682	0	2 52 11.23	2.1038	N. 21 12 37.7	7.642
1	1 16 13.62	1.9847	13 33 28.5	11.617	1	2 54 17.54	2.1065	21 20 13.2	7.540
2	1 18 12.76	1.9867	13 45 3.6	11.552	2	2 56 24.01	2.1091	21 27 42.5	7.437
3	1 20 12.03	1.9888	13 56 34.7	11.484	3	2 58 30.63	2.1117	21 35 5.7	7.334
4	1 22 11.42	1.9909	14 8 1.7	11.415	4	3 0 37.41	2.1142	21 42 22.6	7.230
5	1 24 10.94	1.9931	14 19 24.5	11.346	5	3 2 44.34	2.1168	21 49 33.3	7.126
6	1 26 10.59	1.9952	14 30 43.2	11.276	6	3 4 51.43	2.1194	21 56 37.7	7.021
7	1 28 10.37	1.9974	14 41 57.6	11.205	7	3 6 58.67	2.1218	22 3 35.8	6.915
8	1 30 10.28	1.9995	14 53 7.8	11.134	8	3 9 6.05	2.1243	22 10 27.5	6.809
9	1 32 10.32	2.0018	15 4 13.7	11.062	9	3 11 13.59	2.1268	22 17 12.9	6.702
10	1 34 10.50	2.0042	15 15 15.2	10.988	10	3 13 21.27	2.1292	22 23 51.8	6.594
11	1 36 10.83	2.0066	15 26 12.3	10.914	11	3 15 29.10	2.1317	22 30 24.2	6.486
12	1 38 11.29	2.0089	15 37 4.9	10.839	12	3 17 37.07	2.1341	22 36 50.1	6.377
13	1 40 11.90	2.0113	15 47 53.0	10.763	13	3 19 45.19	2.1364	22 43 9.5	6.268
14	1 42 12.65	2.0137	15 58 36.5	10.687	14	3 21 53.44	2.1387	22 49 22.3	6.158
15	1 44 13.54	2.0161	16 9 15.5	10.611	15	3 24 1.83	2.1410	22 55 28.5	6.047
16	1 46 14.58	2.0187	16 19 49.8	10.533	16	3 26 10.36	2.1433	23 1 28.0	5.937
17	1 48 15.78	2.0212	16 30 19.4	10.454	17	3 28 19.03	2.1456	23 7 20.9	5.826
18	1 50 17.12	2.0236	16 40 44.3	10.375	18	3 30 27.83	2.1477	23 13 7.1	5.714
19	1 52 18.61	2.0262	16 51 4.4	10.294	19	3 32 36.76	2.1498	23 18 46.6	5.602
20	1 54 20.26	2.0287	17 1 19.6	10.212	20	3 34 45.81	2.1519	23 24 19.3	5.488
21	1 56 22.06	2.0312	17 11 29.9	10.131	21	3 36 54.99	2.1541	23 29 45.2	5.375
22	1 58 24.01	2.0338	17 21 35.3	10.049	22	3 39 4.30	2.1561	23 35 4.3	5.262
23	2 0 26.12	2.0365	N. 17 31 35.8	9.966	23	3 41 13.72	2.1581	N. 23 40 16.6	5.148
WEDNESDAY 18.					FRIDAY 20.				
0	2 2 28.39	2.0392	N. 17 41 31.2	9.882	0	3 43 23.27	2.1601	N. 23 45 22.1	5.033
1	2 4 30.82	2.0418	17 51 21.6	9.797	1	3 45 32.93	2.1620	23 50 20.6	4.917
2	2 6 33.40	2.0443	18 1 6.8	9.711	2	3 47 42.71	2.1638	23 55 12.2	4.802
3	2 8 36.14	2.0470	18 10 46.9	9.625	3	3 49 52.59	2.1656	23 59 56.9	4.687
4	2 10 39.04	2.0497	18 20 21.8	9.537	4	3 52 2.58	2.1674	24 4 34.6	4.570
5	2 12 42.10	2.0524	18 29 51.4	9.449	5	3 54 12.68	2.1692	24 9 5.3	4.453
6	2 14 45.33	2.0552	18 39 15.7	9.361	6	3 56 22.88	2.1708	24 13 29.0	4.336
7	2 16 48.72	2.0578	18 48 34.7	9.272	7	3 58 33.17	2.1723	24 17 45.6	4.218
8	2 18 52.27	2.0605	18 57 48.3	9.181	8	4 0 43.56	2.1740	24 21 55.1	4.100
9	2 20 55.98	2.0632	19 6 56.4	9.090	9	4 2 54.05	2.1756	24 25 57.6	3.982
10	2 22 59.86	2.0660	19 15 59.1	8.999	10	4 5 4.63	2.1770	24 29 53.0	3.865
11	2 25 3.90	2.0687	19 24 56.3	8.907	11	4 7 15.29	2.1784	24 33 41.2	3.744
12	2 27 8.10	2.0713	19 33 47.9	8.813	12	4 9 26.04	2.1798	24 37 22.3	3.625
13	2 29 12.46	2.0741	19 42 33.9	8.720	13	4 11 36.87	2.1811	24 40 56.2	3.505
14	2 31 16.99	2.0768	19 51 14.3	8.625	14	4 13 47.77	2.1823	24 44 22.9	3.386
15	2 33 21.68	2.0796	19 59 48.9	8.529	15	4 15 58.75	2.1836	24 47 42.5	3.266
16	2 35 26.54	2.0823	20 8 17.8	8.433	16	4 18 9.80	2.1847	24 50 54.8	3.145
17	2 37 31.56	2.0850	20 16 40.9	8.337	17	4 20 20.91	2.1857	24 53 59.9	3.025
18	2 39 36.74	2.0877	20 24 58.2	8.240	18	4 22 32.08	2.1867	24 56 57.8	2.904
19	2 41 42.08	2.0904	20 33 9.7	8.142	19	4 24 43.32	2.1877	24 59 48.4	2.782
20	2 43 47.59	2.0932	20 41 15.3	8.043	20	4 26 54.61	2.1886	25 2 31.7	2.661
21	2 45 53.26	2.0958	20 49 14.9	7.943	21	4 29 5.95	2.1894	25 5 7.7	2.539
22	2 47 59.09	2.0985	20 57 8.5	7.843	22	4 31 17.34	2.1902	25 7 36.4	2.417
23	2 50 5.08	2.1012	21 4 56.1	7.743	23	4 33 28.78	2.1910	25 9 57.8	2.296
24	2 52 11.23	2.1038	N. 21 12 37.7	7.642	24	4 35 40.26	2.1917	N. 25 12 11.9	2.174

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 21.					MONDAY 23.				
0	4 35 40.26	2.1917	N.25 12 11.9	2.174	0	6 20 26.11	2.1504	N.24 36 0.1	3.621
1	4 37 51.78	2.1922	25 14 18.7	2.052	1	6 22 35.07	2.1482	24 32 19.4	3.735
2	4 40 3.33	2.1927	25 16 18.1	1.989	2	6 24 43.90	2.1460	24 28 31.9	3.849
3	4 42 14.91	2.1932	25 18 10.2	1.807	3	6 26 52.59	2.1437	24 24 37.5	3.963
4	4 44 26.52	2.1937	25 19 54.9	1.684	4	6 29 1.14	2.1415	24 20 36.3	4.076
5	4 46 38.15	2.1940	25 21 32.3	1.562	5	6 31 9.55	2.1390	24 16 28.4	4.188
6	4 48 49.80	2.1942	25 23 2.3	1.438	6	6 33 17.82	2.1366	24 12 13.7	4.301
7	4 51 1.46	2.1945	25 24 24.9	1.316	7	6 35 25.94	2.1342	24 7 52.3	4.412
8	4 53 13.14	2.1947	25 25 40.2	1.193	8	6 37 33.92	2.1317	24 3 24.2	4.523
9	4 55 24.82	2.1947	25 26 48.1	1.070	9	6 39 41.75	2.1292	23 58 49.5	4.634
10	4 57 36.51	2.1948	25 27 48.6	0.947	10	6 41 49.42	2.1266	23 54 8.1	4.745
11	4 59 48.20	2.1947	25 28 41.8	0.825	11	6 43 56.94	2.1240	23 49 20.1	4.854
12	5 1 59.88	2.1947	25 29 27.6	0.702	12	6 46 4.30	2.1214	23 44 25.6	4.963
13	5 4 11.56	2.1945	25 30 6.0	0.578	13	6 48 11.51	2.1188	23 39 24.5	5.072
14	5 6 23.22	2.1942	25 30 37.0	0.456	14	6 50 18.56	2.1161	23 34 16.9	5.181
15	5 8 34.87	2.1940	25 31 0.7	0.333	15	6 52 25.44	2.1133	23 29 2.8	5.288
16	5 10 46.50	2.1936	25 31 17.0	0.210	16	6 54 32.16	2.1107	23 23 42.3	5.395
17	5 12 58.10	2.1932	25 31 25.9	+ 0.087	17	6 56 38.72	2.1080	23 18 15.4	5.502
18	5 15 9.68	2.1927	25 31 27.4	- 0.036	18	6 58 45.12	2.1052	23 12 42.1	5.607
19	5 17 21.22	2.1921	25 31 21.6	0.158	19	7 0 51.35	2.1024	23 7 2.5	5.713
20	5 19 32.73	2.1916	25 31 8.4	0.281	20	7 2 57.41	2.0996	23 1 16.5	5.818
21	5 21 44.21	2.1909	25 30 47.9	0.403	21	7 5 3.30	2.0967	22 55 24.3	5.923
22	5 23 55.64	2.1901	25 30 20.0	0.526	22	7 7 9.02	2.0938	22 49 25.8	6.027
23	5 26 7.02	2.1892	N.25 29 44.8	0.648	23	7 9 14.56	2.0909	N.22 43 21.1	6.129
SUNDAY 22.					TUESDAY 24.				
0	5 28 18.35	2.1884	N.25 29 2.3	0.769	0	7 11 19.93	2.0881	N.22 37 10.3	6.232
1	5 30 29.63	2.1875	25 28 12.5	0.892	1	7 13 25.13	2.0852	22 30 53.3	6.334
2	5 32 40.85	2.1865	25 27 15.3	1.013	2	7 15 30.15	2.0823	22 24 30.2	6.436
3	5 34 52.01	2.1854	25 26 10.9	1.134	3	7 17 35.00	2.0794	22 18 1.0	6.537
4	5 37 3.10	2.1843	25 24 59.2	1.256	4	7 19 39.68	2.0765	22 11 25.7	6.637
5	5 39 14.13	2.1832	25 23 40.2	1.377	5	7 21 44.18	2.0735	22 4 44.5	6.737
6	5 41 25.08	2.1819	25 22 14.0	1.497	6	7 23 48.50	2.0705	21 57 57.3	6.836
7	5 43 35.96	2.1807	25 20 40.5	1.618	7	7 25 52.64	2.0676	21 51 4.2	6.934
8	5 45 46.76	2.1793	25 18 59.8	1.738	8	7 27 56.61	2.0647	21 44 5.2	7.032
9	5 47 57.48	2.1779	25 17 11.9	1.859	9	7 30 0.40	2.0617	21 37 0.4	7.129
10	5 50 8.11	2.1764	25 15 16.7	1.979	10	7 32 4.01	2.0587	21 29 49.7	7.227
11	5 52 18.65	2.1749	25 13 14.4	2.098	11	7 34 7.44	2.0556	21 22 33.2	7.322
12	5 54 29.10	2.1733	25 11 5.0	2.217	12	7 36 10.68	2.0526	21 15 11.1	7.417
13	5 56 39.45	2.1717	25 8 48.4	2.336	13	7 38 13.75	2.0497	21 7 43.2	7.512
14	5 58 49.71	2.1701	25 6 24.7	2.455	14	7 40 16.64	2.0467	21 0 9.7	7.606
15	6 0 59.86	2.1683	25 3 53.8	2.573	15	7 42 19.36	2.0438	20 52 30.5	7.700
16	6 3 9.90	2.1665	25 1 15.9	2.691	16	7 44 21.90	2.0408	20 44 45.7	7.792
17	6 5 19.84	2.1647	24 58 30.9	2.808	17	7 46 24.26	2.0378	20 36 55.4	7.885
18	6 7 29.67	2.1628	24 55 38.9	2.926	18	7 48 26.44	2.0348	20 28 59.5	7.977
19	6 9 39.38	2.1608	24 52 39.8	3.043	19	7 50 28.44	2.0319	20 20 58.2	8.067
20	6 11 48.97	2.1588	24 49 33.7	3.159	20	7 52 30.27	2.0290	20 12 51.4	8.158
21	6 13 58.44	2.1568	24 46 20.7	3.274	21	7 54 31.92	2.0261	20 4 39.2	8.247
22	6 16 7.79	2.1548	24 43 0.8	3.390	22	7 56 33.40	2.0232	19 56 21.7	8.336
23	6 18 17.02	2.1527	24 39 33.9	3.506	23	7 58 34.70	2.0202	19 47 58.9	8.425
24	6 20 26.11	2.1504	N.24 36 0.1	3.621	24	8 0 35.83	2.0174	N.19 39 30.7	8.513

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 25.					FRIDAY 27.				
0	8 0 35.83	2.0174	N. 19 39 30.7	8.523	0	9 34 36.05	1.9140	N. 11 22 4.0	11.965
1	8 2 36.79	2.0145	19 30 57.3	8.600	1	9 36 30.86	1.9129	11 10 4.4	12.021
2	8 4 37.57	2.0116	19 22 18.7	8.687	2	9 38 25.60	1.9118	10 58 1.5	12.076
3	8 6 38.18	2.0087	19 13 34.9	8.772	3	9 40 20.28	1.9109	10 45 55.3	12.131
4	8 8 38.62	2.0059	19 4 46.0	8.857	4	9 42 14.91	1.9101	10 33 45.8	12.185
5	8 10 38.89	2.0032	18 55 52.0	8.942	5	9 44 9.49	1.9092	10 21 33.1	12.238
6	8 12 39.00	2.0004	18 46 53.0	9.026	6	9 46 4.02	1.9085	10 9 17.2	12.291
7	8 14 38.94	1.9976	18 37 48.9	9.109	7	9 47 58.51	1.9078	9 56 58.2	12.343
8	8 16 38.71	1.9948	18 28 39.9	9.192	8	9 49 52.96	1.9072	9 44 36.0	12.395
9	8 18 38.32	1.9921	18 19 25.9	9.274	9	9 51 47.37	1.9065	9 32 10.8	12.445
10	8 20 37.76	1.9894	18 10 7.0	9.356	10	9 53 41.74	1.9060	9 19 42.6	12.495
11	8 22 37.05	1.9867	18 0 43.2	9.436	11	9 55 36.09	1.9056	9 7 11.4	12.545
12	8 24 36.17	1.9841	17 51 14.7	9.515	12	9 57 30.41	1.9051	8 54 37.2	12.594
13	8 26 35.14	1.9815	17 41 41.4	9.595	13	9 59 24.70	1.9048	8 42 0.1	12.642
14	8 28 33.95	1.9789	17 32 3.3	9.674	14	10 1 18.98	1.9046	8 29 20.2	12.689
15	8 30 32.61	1.9763	17 22 20.5	9.752	15	10 3 13.25	1.9043	8 16 37.4	12.736
16	8 32 31.11	1.9737	17 12 33.1	9.829	16	10 5 7.50	1.9042	8 3 51.9	12.782
17	8 34 29.46	1.9712	17 2 41.0	9.907	17	10 7 1.75	1.9041	7 51 3.6	12.827
18	8 36 27.66	1.9688	16 52 44.3	9.983	18	10 8 55.99	1.9040	7 38 12.6	12.872
19	8 38 25.72	1.9664	16 42 43.1	10.057	19	10 10 50.23	1.9041	7 25 19.0	12.916
20	8 40 23.63	1.9640	16 32 37.4	10.132	20	10 12 44.48	1.9042	7 12 22.7	12.959
21	8 42 21.40	1.9616	16 22 27.2	10.207	21	10 14 38.74	1.9044	6 59 23.9	13.002
22	8 44 19.02	1.9593	16 12 12.5	10.281	22	10 16 33.01	1.9047	6 46 22.5	13.044
23	8 46 16.51	1.9571	N. 16 1 53.5	10.353	23	10 18 27.30	1.9050	N. 6 33 18.6	13.085
THURSDAY 26.					SATURDAY 28.				
0	8 48 13.87	1.9548	N. 15 51 30.1	10.426	0	10 20 21.61	1.9054	N. 6 20 12.3	13.125
1	8 50 11.09	1.9526	15 41 2.4	10.497	1	10 22 15.95	1.9058	6 7 3.6	13.165
2	8 52 8.18	1.9503	15 30 30.5	10.567	2	10 24 10.31	1.9063	5 53 52.5	13.205
3	8 54 5.13	1.9482	15 19 54.3	10.638	3	10 26 4.71	1.9070	5 40 39.0	13.243
4	8 56 1.96	1.9462	15 9 13.9	10.708	4	10 27 59.15	1.9077	5 27 23.3	13.280
5	8 57 58.67	1.9441	14 58 29.3	10.777	5	10 29 53.63	1.9083	5 14 5.4	13.317
6	8 59 55.25	1.9421	14 47 40.6	10.845	6	10 31 48.15	1.9092	5 0 45.3	13.353
7	9 1 51.72	1.9402	14 36 47.9	10.912	7	10 33 42.73	1.9102	4 47 23.0	13.389
8	9 3 48.07	1.9382	14 25 51.1	10.980	8	10 35 37.37	1.9111	4 33 58.6	13.423
9	9 5 44.30	1.9362	14 14 50.3	11.047	9	10 37 32.06	1.9121	4 20 32.2	13.458
10	9 7 40.42	1.9344	14 3 45.5	11.112	10	10 39 26.82	1.9132	4 7 3.7	13.491
11	9 9 36.43	1.9327	13 52 36.8	11.177	11	10 41 21.65	1.9143	3 53 33.3	13.522
12	9 11 32.34	1.9310	13 41 24.2	11.242	12	10 43 16.54	1.9156	3 40 1.1	13.553
13	9 13 28.15	1.9293	13 30 7.8	11.306	13	10 45 11.52	1.9170	3 26 26.9	13.585
14	9 15 23.85	1.9276	13 18 47.5	11.369	14	10 47 6.58	1.9183	3 12 50.9	13.615
15	9 17 19.46	1.9260	13 7 23.5	11.432	15	10 49 1.72	1.9198	2 59 13.1	13.645
16	9 19 14.97	1.9244	12 55 55.7	11.493	16	10 50 56.96	1.9214	2 45 33.5	13.673
17	9 21 10.39	1.9229	12 44 24.3	11.554	17	10 52 52.29	1.9230	2 31 52.3	13.701
18	9 23 5.72	1.9215	12 32 49.2	11.615	18	10 54 47.72	1.9247	2 18 9.4	13.728
19	9 25 0.97	1.9202	12 21 10.5	11.675	19	10 56 43.25	1.9264	2 4 24.9	13.755
20	9 26 56.14	1.9188	12 9 28.2	11.735	20	10 58 38.89	1.9283	1 50 38.8	13.780
21	9 28 51.23	1.9175	11 57 42.3	11.793	21	11 0 34.65	1.9303	1 36 51.3	13.804
22	9 30 46.24	1.9162	11 45 53.0	11.851	22	11 2 30.53	1.9323	1 23 2.3	13.828
23	9 32 41.18	1.9151	11 34 0.2	11.908	23	11 4 26.53	1.9343	1 9 11.9	13.851
24	9 34 36.05	1.9140	N. 11 22 4.0	11.965	24	11 6 22.65	1.9365	N. 0 55 20.2	13.875

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 29.					TUESDAY 31.				
0	11 6 22.65	1.9365	N. 0 55 20.2	13.873	0	12 43 23.88	2.1380	S. 10 17 20.0	13.722
1	11 8 18.91	1.9388	0 41 27.2	13.894	1	12 45 32.34	2.1442	10 31 2.3	13.687
2	11 10 15.31	1.9412	0 27 32.9	13.914	2	12 47 41.18	2.1505	10 44 42.5	13.652
3	11 12 11.85	1.9436	N. 0 13 37.5	13.933	3	12 49 50.40	2.1568	10 58 20.6	13.616
4	11 14 8.54	1.9461	S. 0 0 19.1	13.952	4	12 52 0.00	2.1632	11 11 56.4	13.577
5	11 16 5.38	1.9487	0 14 16.8	13.970	5	12 54 9.99	2.1698	11 25 29.8	13.537
6	11 18 2.38	1.9513	0 28 15.5	13.987	6	12 56 20.38	2.1764	11 39 0.8	13.496
7	11 19 59.54	1.9540	0 42 15.2	14.002	7	12 58 31.16	2.1831	11 52 29.3	13.453
8	11 21 56.86	1.9568	0 56 15.8	14.018	8	13 0 42.35	2.1898	12 5 55.1	13.408
9	11 23 54.36	1.9597	1 10 17.3	14.032	9	13 2 53.94	2.1967	12 19 18.2	13.362
10	11 25 52.03	1.9627	1 24 19.6	14.044	10	13 5 5.95	2.2036	12 32 38.5	13.314
11	11 27 49.89	1.9658	1 38 22.6	14.056	11	13 7 18.37	2.2104	12 45 55.9	13.265
12	11 29 47.93	1.9690	1 52 26.3	14.067	12	13 9 31.20	2.2174	12 59 10.3	13.213
13	11 31 46.17	1.9722	2 6 30.7	14.077	13	13 11 44.46	2.2246	13 12 21.5	13.160
14	11 33 44.60	1.9755	2 20 35.6	14.087	14	13 13 58.15	2.2318	13 25 29.5	13.106
15	11 35 43.23	1.9789	2 34 41.1	14.095	15	13 16 12.27	2.2390	13 38 34.2	13.050
16	11 37 42.07	1.9824	2 48 47.0	14.102	16	13 18 26.83	2.2462	13 51 35.5	12.992
17	11 39 41.12	1.9859	3 2 53.3	14.108	17	13 20 41.82	2.2536	14 4 33.3	12.932
18	11 41 40.38	1.9896	3 17 0.0	14.113	18	13 22 57.26	2.2610	14 17 27.3	12.869
19	11 43 39.87	1.9933	3 31 6.9	14.117	19	13 25 13.14	2.2684	14 30 17.6	12.807
20	11 45 39.58	1.9972	3 45 14.0	14.120	20	13 27 29.47	2.2760	14 43 4.1	12.742
21	11 47 39.53	2.0011	3 59 21.3	14.122	21	13 29 46.26	2.2836	14 55 46.6	12.674
22	11 49 39.71	2.0050	4 13 28.7	14.123	22	13 32 3.50	2.2912	15 8 25.0	12.606
23	11 51 40.13	2.0090	S. 4 27 36.1	14.122	23	13 34 21.20	2.2989	S. 15 20 59.3	12.536
MONDAY 30.					WEDNESDAY, JUNE 1.				
0	11 53 40.79	2.0132	S. 4 41 43.4	14.121	0	13 36 39.37	2.3067	S. 15 33 29.3	12.465
1	11 55 41.71	2.0174	4 55 50.6	14.119	PHASES OF THE MOON.				
2	11 57 42.88	2.0217	5 9 57.7	14.116					
3	11 59 44.32	2.0262	5 24 4.5	14.111					
4	12 1 46.03	2.0307	5 38 11.0	14.105					
5	12 3 48.00	2.0352	5 52 17.1	14.098					
6	12 5 50.25	2.0399	6 6 22.8	14.090	<div>Full Moon . . . . May 5 18 33.7</div> <div>Last Quarter . . . . 12 9 35.8</div> <div>New Moon . . . . . 20 0 58.2</div> <div>First Quarter . . . . . 28 5 13.9</div>				
7	12 7 52.79	2.0447	6 20 27.9	14.080					
8	12 9 55.61	2.0495	6 34 32.4	14.070					
9	12 11 58.73	2.0544	6 48 36.3	14.058					
10	12 14 2.14	2.0593	7 2 39.4	14.045					
11	12 16 5.85	2.0644	7 16 41.7	14.030	<div>Perigee . . . . . May 7 8.8</div> <div>Apogee . . . . . 22 20.5</div>				
12	12 18 9.87	2.0696	7 30 43.0	14.014					
13	12 20 14.20	2.0748	7 44 43.4	13.997					
14	12 22 18.85	2.0802	7 58 42.7	13.979					
15	12 24 23.82	2.0856	8 12 40.9	13.960					
16	12 26 29.12	2.0911	8 26 37.9	13.939					
17	12 28 34.75	2.0967	8 40 33.6	13.917					
18	12 30 40.72	2.1023	8 54 27.9	13.893					
19	12 32 47.03	2.1080	9 8 20.7	13.868					
20	12 34 53.68	2.1138	9 22 12.0	13.842					
21	12 37 0.69	2.1197	9 36 1.7	13.813					
22	12 39 8.05	2.1257	9 49 49.6	13.784					
23	12 41 15.78	2.1319	10 3 35.8	13.753					
24	12 43 23.88	2.1380	S. 10 17 20.0	13.721					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	Aldebaran W.	90 11 35	2725	91 47 42	2707	93 24 12	2690	95 1 5	2672
	Pollux W.	48 10 53	2726	49 46 58	2706	51 23 30	2687	53 0 28	2667
	Spica E.	43 28 49	2685	41 51 49	2669	40 14 28	2653	38 36 45	2636
	Antares E.	89 7 39	2674	87 30 24	2656	85 52 45	2638	84 14 42	2621
	SATURN E.	92 10 47	2670	90 33 27	2653	88 55 44	2635	87 17 37	2618
2	Pollux W.	61 11 53	2570	62 51 29	2551	64 31 32	2532	66 12 1	2512
	Regulus W.	24 9 47	2578	25 49 12	2555	27 29 9	2533	29 9 37	2511
	Antares E.	75 58 27	2532	74 17 58	2513	72 37 3	2496	70 55 44	2477
	SATURN E.	79 1 4	2530	77 20 32	2512	75 39 35	2494	73 58 13	2477
3	Pollux W.	74 41 1	2421	76 24 6	2403	78 7 37	2385	79 51 33	2368
	Regulus W.	37 39 17	2410	39 22 37	2391	41 6 25	2373	42 50 39	2355
	Antares E.	62 22 48	2389	60 38 58	2372	58 54 43	2355	57 10 4	2338
	SATURN E.	65 25 16	2391	63 41 28	2374	61 57 16	2357	60 12 40	2342
4	Pollux W.	88 37 12	2288	90 23 29	2273	92 10 8	2259	93 57 8	2245
	Regulus W.	51 38 9	2270	53 24 52	2256	55 11 57	2241	56 59 24	2226
	Antares E.	48 20 49	2259	46 33 49	2245	44 46 28	2230	42 58 45	2216
	SATURN E.	51 24 3	2268	49 37 16	2254	47 50 9	2242	46 2 44	2230
	$\alpha$ Aquilæ E.	101 38 18	2232	100 4 32	2211	98 30 19	2192	96 55 40	2173
5	Regulus W.	66 1 50	2161	67 51 16	2150	69 40 59	2139	71 30 58	2130
	JUPITER W.	33 49 29	2214	35 37 35	2196	37 26 8	2180	39 15 5	2165
	$\alpha$ Aquilæ E.	88 57 1	2703	87 20 25	2694	85 43 37	2687	84 6 39	2680
6	Regulus W.	80 44 23	2089	82 35 39	2083	84 27 5	2077	86 18 39	2073
	JUPITER W.	48 24 53	2103	50 15 40	2100	52 6 39	2092	53 57 50	2086
	Spica E.	26 43 29	2108	28 34 16	2099	30 25 17	2091	32 16 30	2084
	$\alpha$ Aquilæ W.	76 0 28	2675	74 23 15	2681	72 46 9	2687	71 9 12	2696
	Fomalhaut E.	100 45 48	2504	99 4 40	2494	97 23 18	2485	95 41 43	2477
7	Regulus W.	95 37 56	2060	97 29 57	2059	99 22 0	2059	101 14 3	2060
	JUPITER W.	63 15 48	2066	65 7 39	2064	66 59 33	2064	68 51 28	2064
	Spica W.	41 34 44	2064	43 26 39	2062	45 18 36	2062	47 10 34	2061
	$\alpha$ Aquilæ E.	63 8 34	2780	61 33 40	2806	59 59 20	2835	58 25 37	2868
	Fomalhaut E.	87 11 57	2463	85 29 52	2465	83 47 49	2467	82 5 50	2472
	$\alpha$ Pegasi E.	108 12 21	2214	106 24 14	2210	104 36 1	2208	102 47 45	2206
8	JUPITER W.	78 10 39	2075	80 2 17	2079	81 53 49	2084	83 45 13	2089
	Spica W.	56 30 5	2072	58 21 47	2076	60 13 23	2081	62 4 52	2086
	Fomalhaut E.	73 38 14	2518	71 57 26	2533	70 16 58	2548	68 36 52	2566
	$\alpha$ Pegasi E.	93 46 15	2212	91 58 5	2216	90 10 2	2221	88 22 6	2227
	MARS E.	108 21 37	2321	106 36 8	2326	104 50 46	2331	103 5 31	2336
9	JUPITER W.	92 59 51	2125	94 50 12	2134	96 40 19	2143	98 30 12	2153
	Spica W.	71 19 55	2121	73 10 22	2130	75 0 36	2138	76 50 37	2148
	Antares W.	25 36 20	2119	27 26 50	2127	29 17 8	2136	31 7 12	2145
	SATURN W.	23 32 37	2197	25 21 9	2194	27 9 46	2192	28 58 25	2193
	Fomalhaut E.	60 23 27	2687	58 46 30	2719	57 10 16	2753	55 34 47	2791
	$\alpha$ Pegasi E.	79 25 1	2269	77 38 16	2279	75 51 46	2291	74 5 33	2303
	MARS E.	94 21 33	2373	92 37 19	2382	90 53 18	2391	89 9 30	2401

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
1	Aldebaran	W.	96 38 22	2655	98 16 2	2658	99 54 5	2621	101 32 32	2605
	Pollux	W.	54 37 52	2647	56 15 43	2628	57 54 0	2609	59 32 43	2589
	Spica	E.	36 58 39	2620	35 20 11	2603	33 41 20	2588	32 2 8	2571
	Antares	E.	82 36 16	2604	80 57 26	2585	79 18 11	2567	77 38 31	2550
	SATURN	E.	85 39 7	2601	84 0 13	2583	82 20 54	2565	80 41 11	2548
2	Pollux	W.	67 52 57	2494	69 34 19	2475	71 16 7	2457	72 58 21	2438
	Regulus	W.	30 50 35	2490	32 32 2	2469	34 13 59	2449	35 56 24	2439
	Antares	E.	69 13 59	2460	67 31 49	2442	65 49 14	2424	64 6 14	2406
	SATURN	E.	72 16 27	2459	70 34 16	2441	68 51 40	2424	67 8 40	2408
3	Pollux	W.	81 35 53	2351	83 20 38	2335	85 5 46	2319	86 51 18	2304
	Regulus	W.	44 35 19	2337	46 20 24	2320	48 5 55	2303	49 51 50	2287
	Antares	E.	55 25 0	2322	53 39 32	2306	51 53 41	2289	50 7 26	2274
	SATURN	E.	58 27 41	2326	56 42 19	2311	54 56 35	2296	53 10 30	2281
4	Pollux	W.	95 44 29	2231	97 32 10	2218	99 20 10	2206	101 8 28	2195
	Regulus	W.	58 47 13	2212	60 35 23	2198	62 23 53	2186	64 12 42	2173
	Antares	E.	41 10 41	2202	39 22 17	2190	37 33 34	2177	35 44 32	2166
	SATURN	E.	44 15 1	2219	42 27 2	2208	40 38 47	2199	38 50 18	2190
	α Aquilæ	E.	95 20 37	2756	93 45 11	2741	92 9 26	2727	90 33 22	2714
5	Regulus	W.	73 21 12	2120	75 11 41	2111	77 2 23	2103	78 53 17	2096
	JUPITER	W.	41 4 25	2152	42 54 5	2139	44 44 4	2128	46 34 21	2118
	α Aquilæ	E.	82 29 32	2675	80 52 19	2673	79 15 3	2672	77 37 45	2672
6	Regulus	W.	88 10 20	2069	90 2 7	2065	91 54 0	2062	93 45 57	2061
	JUPITER	W.	55 49 11	2080	57 40 41	2075	59 32 18	2072	61 24 1	2069
	Spica	W.	34 7 54	2078	35 59 27	2073	37 51 7	2070	39 42 53	2066
	α Aquilæ	E.	69 32 27	2707	67 55 57	2722	66 19 46	2738	64 43 57	2758
	Fomalhaut	E.	93 59 58	2472	92 18 5	2467	90 36 6	2465	88 54 3	2462
7	Regulus	W.	103 6 4	2061	104 58 3	2063	106 49 59	2066	108 41 50	2070
	JUPITER	W.	70 43 22	2064	72 35 16	2066	74 27 7	2068	76 18 55	2071
	Spica	W.	49 2 33	2062	50 54 31	2064	52 46 26	2066	54 38 18	2069
	α Aquilæ	E.	56 52 37	2905	55 20 25	2946	53 49 5	2993	52 18 43	3045
	Fomalhaut	E.	80 23 57	2478	78 42 13	2486	77 0 40	2494	75 19 19	2506
	α Pegasi	E.	100 59 26	2205	99 11 6	2206	97 22 47	2206	95 34 29	2209
8	JUPITER	W.	85 36 29	2095	87 27 36	2102	89 18 32	2109	91 9 17	2116
	Spica	W.	63 56 12	2092	65 47 23	2098	67 38 25	2105	69 29 16	2113
	Fomalhaut	E.	66 57 11	2586	65 17 57	2608	63 39 13	2632	62 1 2	2659
	α Pegasi	E.	86 34 19	2233	84 46 41	2241	82 59 15	2249	81 12 1	2259
	MARS	E.	101 20 24	2342	99 35 26	2348	97 50 37	2356	96 5 59	2364
9	JUPITER	W.	100 19 51	2163	102 9 14	2174	103 58 21	2185	105 47 11	2197
	Spica	W.	78 40 23	2157	80 29 55	2168	82 19 11	2178	84 8 11	2189
	Antares	W.	32 57 3	2155	34 46 39	2164	36 36 1	2174	38 25 7	2186
	SATURN	W.	30 47 3	2196	32 35 37	2199	34 24 6	2204	36 12 27	2211
	Fomalhaut	E.	54 0 7	2831	52 26 20	2876	50 53 31	2925	49 21 44	2979
	α Pegasi	E.	72 19 38	2316	70 34 2	2331	68 48 47	2345	67 3 53	2361
	MARS	E.	87 25 57	2412	85 42 39	2428	83 59 36	2433	82 16 49	2445

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Spica W.	85 56 55	2200	87 45 22	2212	89 33 32	2224	91 21 24	2235
	Antares W.	40 13 56	2196	42 2 29	2208	43 50 45	2219	45 38 44	2231
	SATURN W.	38 0 38	2218	39 48 38	2227	41 36 26	2235	43 24 1	2245
	Fomalhaut E.	47 51 5	3037	46 21 38	3101	44 53 30	3172	43 26 47	3250
	α Pegasi E.	65 19 22	2378	63 35 15	2394	61 51 32	2412	60 8 15	2432
	MARS E.	80 34 19	2458	78 52 6	2470	77 10 11	2483	75 28 34	2496
	SUN E.	121 25 48	2512	119 44 52	2524	118 4 12	2536	116 23 49	2548
11	Spica W.	100 16 12	2299	102 2 13	2312	103 47 55	2325	105 33 18	2339
	Antares W.	54 34 7	2294	56 20 16	2307	58 6 5	2320	59 51 35	2333
	SATURN W.	52 18 8	2299	54 4 9	2311	55 49 52	2323	57 35 18	2335
	α Pegasi E.	51 39 9	2544	49 58 57	2571	48 19 22	2599	46 40 25	2609
	MARS E.	67 5 11	2566	65 25 29	2580	63 46 7	2595	62 7 5	2610
	SUN E.	108 6 16	2614	106 27 40	2627	104 49 22	2641	103 11 23	2655
12	Antares W.	68 34 17	2400	70 17 52	2413	72 1 8	2426	73 44 5	2441
	SATURN W.	66 18 0	2398	68 1 37	2411	69 44 56	2424	71 27 57	2437
	MARS E.	53 57 9	2688	52 20 13	2704	50 43 39	2720	49 7 26	2736
	SUN E.	95 6 13	2726	93 30 8	2741	91 54 22	2755	90 18 55	2768
13	Antares W.	82 14 6	2506	83 55 11	2519	85 35 58	2531	87 16 28	2544
	SATURN W.	79 58 27	2501	81 39 39	2513	83 20 34	2526	85 1 11	2538
	α Aquilæ W.	38 27 54	4309	39 34 38	4394	40 43 10	4495	41 53 17	4607
	MARS E.	41 11 49	2821	39 37 49	2840	38 4 13	2858	36 31 0	2877
	SUN E.	82 26 20	2840	80 52 44	2853	79 19 25	2868	77 46 25	2881
14	Antares W.	95 34 37	2605	97 13 25	2618	98 51 56	2629	100 30 12	2640
	SATURN W.	93 20 1	2599	94 58 57	2611	96 37 37	2623	98 16 1	2635
	α Aquilæ W.	48 2 39	3700	49 19 26	3659	50 36 57	3623	51 55 7	3590
	SUN E.	70 5 41	2948	68 34 23	2961	67 3 21	2973	65 32 35	2986
15	SATURN W.	106 24 10	2690	108 1 3	2701	109 37 41	2711	111 14 6	2722
	α Aquilæ W.	58 33 32	3478	59 54 21	3493	61 15 27	3450	62 36 47	3438
	SUN E.	58 2 39	3047	56 33 25	3059	55 4 25	3070	53 35 39	3082
16	α Aquilæ W.	69 26 0	3406	70 48 10	3403	72 10 23	3401	73 32 38	3400
	Fomalhaut W.	44 49 7	3677	46 6 19	3639	47 24 11	3606	48 42 39	3576
	SUN E.	46 15 20	3138	44 47 57	3149	43 20 47	3160	41 53 50	3171
17	α Aquilæ W.	80 23 52	3408	81 46 0	3410	83 8 5	3415	84 30 5	3420
	Fomalhaut W.	55 21 59	3471	56 42 55	3458	58 4 6	3446	59 25 31	3435
	α Pegasi W.	32 37 49	3376	34 0 33	3344	35 23 54	3315	36 47 48	3291
	SUN E.	34 42 20	3225	33 16 41	3237	31 51 16	3248	30 26 4	3259
22	SUN W.	21 35 5	3500	22 55 29	3496	24 15 58	3492	25 36 31	3489
	Regulus E.	65 34 31	3075	64 5 51	3078	62 37 14	3080	61 8 40	3082
	JUPITER E.	97 28 16	3086	95 59 49	3087	94 31 24	3090	93 3 2	3091
23	SUN W.	32 20 1	3478	33 40 50	3475	35 1 42	3473	36 22 36	3471
	Regulus E.	53 46 27	3091	52 18 6	3092	50 49 47	3092	49 21 28	3093
	JUPITER E.	85 41 42	3099	84 13 31	3099	82 45 20	3100	81 17 10	3101
	Spica E.	107 49 2	3082	106 20 31	3083	104 52 1	3083	103 23 31	3083



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Dist.	XVh.	P. L. of Dist.	XVIIIh.	P. L. of Dist.	XXIh.	P. L. of Dist.
		° ' "		° ' "		° ' "		° ' "	
10	Spica W.	93 8 59	2248	94 56 15	2260	96 43 13	2273	98 29 52	2286
	Antares W.	47 26 25	2243	49 13 48	2256	51 0 53	2268	52 47 39	2281
	SATURN W.	45 11 21	2255	46 58 27	2266	48 45 17	2277	50 31 51	2288
	Fomalhaut E.	42 1 37	3337	40 38 8	3432	39 16 28	3539	37 56 47	3660
	α Pegasi E.	58 25 26	2453	56 43 6	2473	55 1 15	2496	53 19 56	2519
	MARS E.	73 47 15	2510	72 6 15	2523	70 25 34	2538	68 45 13	2551
	SUN E.	114 43 43	2561	113 3 55	2574	111 24 24	2597	109 45 11	2600
11	Spica W.	107 18 21	2352	109 3 5	2366	110 47 29	2379	112 31 34	2393
	Antares W.	61 36 46	2346	63 21 38	2360	65 6 10	2373	66 50 23	2387
	SATURN W.	59 20 27	2347	61 5 18	2360	62 49 50	2373	64 34 4	2385
	α Pegasi E.	45 2 9	2660	43 24 36	2695	41 47 50	2732	40 11 53	2772
	MARS E.	60 28 24	2625	58 50 3	2641	57 12 4	2657	55 34 26	2672
	SUN E.	101 33 43	2669	99 56 22	2684	98 19 20	2698	96 42 37	2712
12	Antares W.	75 26 42	2453	77 9 1	2467	78 51 1	2480	80 32 43	2493
	SATURN W.	73 10 39	2450	74 53 3	2462	76 35 9	2475	78 16 57	2488
	MARS E.	47 31 34	2753	45 56 4	2770	44 20 57	2787	42 46 12	2804
	SUN E.	88 43 47	2784	87 8 58	2798	85 34 27	2811	84 0 14	2826
13	Antares W.	88 56 40	2556	90 36 35	2569	92 16 12	2581	93 55 33	2593
	SATURN W.	86 41 31	2551	88 21 34	2563	90 1 20	2575	91 40 49	2588
	α Aquilæ W.	43 4 50	3929	44 17 40	3860	45 31 40	3800	46 46 42	3747
	MARS E.	34 58 12	2897	33 25 49	2917	31 53 52	2939	30 22 22	2960
	SUN E.	76 13 42	2894	74 41 16	2909	73 9 8	2921	71 37 16	2935
14	Antares W.	102 8 12	2652	103 45 57	2663	105 23 27	2674	107 0 42	2685
	SATURN W.	99 54 9	2646	101 32 2	2657	103 9 40	2669	104 47 2	2679
	α Aquilæ W.	53 13 52	3561	54 33 9	3536	55 52 53	3514	57 13 2	3495
	SUN E.	64 2 5	2990	62 31 51	3011	61 1 52	3023	59 32 8	3035
15	SATURN W.	112 50 16	2733	114 26 12	2743	116 1 55	2753	117 37 24	2763
	α Aquilæ W.	63 58 20	3430	65 20 3	3422	66 41 55	3415	68 3 55	3410
	SUN E.	52 7 8	3094	50 38 51	3105	49 10 47	3116	47 42 57	3127
16	α Aquilæ W.	74 54 54	3400	76 17 10	3400	77 39 26	3402	79 1 40	3404
	Fomalhaut W.	50 1 40	3550	51 21 9	3526	52 41 4	3506	54 1 21	3488
	SUN E.	40 27 6	3182	39 0 35	3193	37 34 17	3204	36 8 12	3214
17	α Aquilæ W.	85 51 59	3425	87 13 47	3431	88 35 29	3438	89 57 3	3445
	Fomalhaut W.	60 47 8	3426	62 8 55	3417	63 30 52	3411	64 52 56	3405
	α Pegasi W.	38 12 10	3270	39 36 56	3252	41 2 4	3237	42 27 29	3225
	SUN E.	29 1 5	3271	27 36 20	3284	26 11 50	3297	24 47 35	3312
22	SUN W.	26 57 7	3486	28 17 47	3484	29 38 29	3481	30 59 14	3480
	Regulus E.	59 40 9	3084	58 11 40	3087	56 43 14	3088	55 14 50	3089
	JUPITER E.	91 34 42	3094	90 6 25	3095	88 38 9	3096	87 9 55	3097
23	SUN W.	37 43 32	3470	39 4 30	3467	40 25 31	3464	41 46 35	3462
	Regulus E.	47 53 10	3093	46 24 52	3094	44 56 35	3094	43 28 18	3093
	JUPITER E.	79 49 1	3100	78 20 51	3100	76 52 41	3099	75 24 30	3098
	Spica E.	101 55 1	3082	100 26 30	3082	98 57 58	3081	97 29 25	3079

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
24	SUN W.	43 7 42	3459	44 28 52	3455	45 50 6	3453	47 11 23	3448
	Regulus E.	42 0 0	3093	40 31 42	3092	39 3 23	3091	37 35 3	3091
	JUPITER E.	73 56 18	3097	72 28 5	3096	70 59 50	3094	69 31 33	3092
	Spica E.	96 0 50	3078	94 32 13	3076	93 3 34	3075	91 34 52	3070
25	SUN W.	53 59 1	3435	55 20 49	3419	56 42 44	3413	58 4 46	3407
	VENUS W.	29 15 16	3511	30 35 28	3505	31 55 47	3499	33 16 12	3493
	Regulus E.	30 13 5	3086	28 44 38	3084	27 16 9	3084	25 47 40	3083
	JUPITER E.	62 9 28	3078	60 40 52	3075	59 12 12	3071	57 43 27	3066
	Spica E.	84 10 23	3052	82 41 14	3047	81 12 0	3043	79 42 40	3037
26	SUN W.	64 56 56	3368	66 19 49	3358	67 42 53	3349	69 6 8	3339
	VENUS W.	40 0 13	3455	41 21 27	3446	42 42 52	3437	44 4 27	3426
	Pollux W.	20 13 13	3261	21 38 10	3221	23 3 54	3186	24 30 20	3154
	JUPITER E.	50 18 16	3042	48 48 55	3036	47 19 27	3030	45 49 52	3024
	Spica E.	72 14 7	3003	70 43 58	2996	69 13 40	2987	67 43 11	2979
27	SUN W.	76 5 21	3284	77 29 51	3271	78 54 36	3259	80 19 36	3246
	VENUS W.	50 55 22	3371	52 18 12	3358	53 41 17	3345	55 4 36	3332
	Pollux W.	31 50 55	3034	33 20 26	3014	34 50 22	2994	36 20 42	2976
	JUPITER E.	38 20 3	2994	36 49 43	2988	35 19 15	2983	33 48 41	2978
	Spica E.	60 7 56	2930	58 36 15	2919	57 4 20	2908	55 32 11	2896
	Antares E.	105 47 54	2922	104 16 3	2911	102 43 58	2899	101 11 38	2887
	SATURN E.	107 1 57	2914	105 29 56	2903	103 57 41	2891	102 25 11	2879
28	SUN W.	87 28 39	3173	88 55 20	3158	90 22 20	3142	91 49 39	3125
	VENUS W.	62 5 15	3259	63 30 15	3242	64 55 34	3226	66 21 12	3209
	Pollux W.	43 58 8	2885	45 30 46	2868	47 3 46	2850	48 37 9	2832
	Spica E.	47 47 32	2832	46 13 46	2818	44 39 42	2805	43 5 20	2791
	Antares E.	93 25 57	2821	91 51 57	2807	90 17 38	2792	88 43 0	2777
	SATURN E.	94 38 35	2812	93 4 23	2798	91 29 53	2784	89 55 4	2769
29	SUN W.	99 11 20	3039	100 40 45	3021	102 10 32	3002	103 40 42	2983
	VENUS W.	73 34 28	3121	75 2 12	3103	76 30 18	3084	77 58 47	3065
	Pollux W.	56 29 54	2741	58 5 39	2723	59 41 48	2704	61 18 22	2687
	Spica E.	35 8 46	2716	33 32 28	2702	31 55 51	2687	30 18 53	2672
	Antares E.	80 44 44	2697	79 8 0	2681	77 30 54	2663	75 53 25	2646
	SATURN E.	81 55 54	2689	80 19 0	2673	78 41 44	2656	77 4 5	2640
30	SUN W.	111 17 32	2887	112 50 8	2866	114 23 10	2847	115 56 37	2827
	VENUS W.	85 27 14	2965	86 58 10	2946	88 29 31	2925	90 1 18	2904
	Pollux W.	69 27 29	2591	71 6 36	2572	72 46 9	2553	74 26 9	2534
	Regulus W.	32 25 8	2587	34 4 21	2566	35 44 3	2545	37 24 14	2525
	Antares E.	67 40 0	2556	66 0 5	2538	64 19 44	2519	62 38 57	2501
	SATURN E.	68 50 1	2552	67 10 0	2534	65 29 34	2517	63 48 44	2498
31	VENUS W.	97 46 49	2801	99 21 15	2781	100 56 8	2761	102 31 27	2741
	Pollux W.	82 52 48	2438	84 35 29	2419	86 18 36	2401	88 2 10	2382
	Regulus W.	45 52 15	2424	47 35 16	2404	49 18 45	2384	51 2 42	2365
	Antares E.	54 8 32	2407	52 25 7	2389	50 41 16	2370	48 56 58	2352
	SATURN E.	55 18 14	2410	53 34 53	2392	51 51 7	2375	50 6 57	2358
	α Aquilæ E.	106 46 20	3002	105 16 10	2973	103 45 24	2946	102 14 4	2930

GREENWICH MEAN TIME.										
LUNAR DISTANCES.										
Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
24	SUN	W.	° ' "		° ' "		° ' "		° ' "	
	Regulus	E.	48 32 45	3444	49 54 12	3440	51 15 43	3436	52 37 19	3431
	JUPITER	E.	36 6 42	3090	34 38 20	3088	33 9 56	3087	31 41 31	3087
	Spica	E.	68 3 14	3090	66 34 52	3088	65 6 28	3085	63 38 0	3082
25	VENUS	E.	90 6 6	3068	88 37 17	3065	87 8 24	3060	85 39 26	3056
	SUN	W.	59 26 55	3400	60 49 12	3392	62 11 38	3385	63 34 12	3376
	Regulus	W.	34 36 44	3487	35 57 23	3479	37 18 11	3471	38 39 8	3463
	JUPITER	E.	24 19 10	3084	22 50 41	3086	21 22 14	3088	19 53 50	3094
26	Spica	E.	56 14 36	3062	54 45 40	3057	53 16 38	3052	51 47 30	3047
	SUN	W.	78 13 13	3031	76 43 39	3025	75 13 57	3018	73 44 6	3011
	VENUS	W.	70 29 34	3329	71 53 12	3319	73 17 2	3307	74 41 5	3296
	Pollux	W.	45 26 14	3416	46 48 12	3405	48 10 23	3394	49 32 46	3383
27	JUPITER	E.	25 57 24	3126	27 25 2	3101	28 53 11	3077	30 21 49	3054
	Spica	E.	44 20 9	3018	42 50 19	3012	41 20 21	3006	39 50 16	3000
	SUN	W.	66 12 32	2969	64 41 41	2961	63 10 39	2950	61 39 24	2940
	VENUS	W.	81 44 51	3231	83 10 23	3218	84 36 11	3204	86 2 16	3188
28	Pollux	W.	56 28 11	3318	57 52 2	3304	59 16 9	3289	60 40 33	3274
	JUPITER	E.	37 51 25	2957	39 22 32	2939	40 54 1	2921	42 25 53	2903
	Spica	E.	32 18 1	2974	30 47 16	2971	29 16 27	2969	27 45 35	2969
	Antares	E.	53 59 47	2883	52 27 7	2872	50 54 12	2859	49 21 0	2846
29	SATURN	E.	99 39 3	2875	98 6 12	2862	96 33 4	2848	94 59 39	2835
	SUN	W.	100 52 25	2866	99 19 23	2853	97 46 4	2840	96 12 28	2827
	VENUS	W.	93 17 18	3109	94 45 17	3091	96 13 37	3074	97 42 18	3057
	Pollux	W.	67 47 10	3193	69 13 28	3175	70 40 7	3158	72 7 7	3140
30	Spica	E.	50 10 55	2815	51 45 4	2796	53 19 37	2779	54 54 33	2760
	Antares	E.	41 30 40	2776	39 55 41	2761	38 20 22	2747	36 44 44	2732
	SATURN	E.	87 8 2	2762	85 32 44	2746	83 57 5	2730	82 21 5	2714
	SUN	W.	88 19 55	2753	86 44 26	2738	85 8 36	2722	83 32 26	2706
31	VENUS	W.	105 11 16	2965	106 42 13	2945	108 13 35	2926	109 45 21	2906
	Pollux	W.	79 27 40	3045	80 56 57	3026	82 26 38	3005	83 56 44	2986
	Spica	E.	62 55 20	2667	64 32 44	2649	66 10 33	2629	67 48 48	2610
	Antares	E.	28 41 36	2657	27 3 58	2643	25 26 1	2629	23 47 46	2616
32	SATURN	E.	74 15 32	2629	72 37 16	2610	70 58 35	2593	69 19 30	2574
	SUN	W.	75 26 4	2622	73 47 39	2604	72 8 50	2588	70 29 38	2569
	VENUS	W.	117 30 30	2807	119 4 49	2787	120 39 34	2767	122 14 45	2747
	Pollux	W.	91 33 32	2884	93 6 11	2863	94 39 17	2842	96 12 50	2822
33	Regulus	W.	76 6 35	2515	77 47 28	2495	79 28 48	2476	81 10 35	2458
	Antares	E.	39 4 53	2504	40 46 1	2484	42 27 37	2463	44 9 42	2443
	SATURN	E.	60 57 45	2482	59 16 6	2463	57 34 1	2445	55 51 30	2426
	SUN	W.	62 7 28	2480	60 25 47	2462	58 43 41	2445	57 1 10	2427
34	VENUS	W.	104 7 13	2720	105 43 26	2701	107 20 5	2681	108 57 10	2661
	Pollux	W.	89 46 10	2364	91 30 37	2346	93 15 30	2328	95 0 49	2310
	Regulus	W.	52 47 7	2346	54 31 59	2328	56 17 18	2309	58 3 5	2291
	Antares	E.	47 12 14	2333	45 27 3	2315	43 41 26	2298	41 55 23	2280
35	SATURN	E.	48 22 22	2312	46 37 23	2306	44 52 1	2310	43 6 16	2296
	α Aquilæ	E.	100 42 11	2295	99 9 46	2272	97 36 51	2249	96 3 27	2228

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Equation of Time, to be Subtracted from	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.	Sidereal Time of Semi-diameter Passing Meridian.		
Wed.	1	h m s 4 37 32.82	10.232	N.22 6 0.7	+20.12	15 48.36	68.42	m s 2 24.55	s 0.375
Thur.	2	4 41 38.60	10.248	22 13 52.2	19.16	15 48.23	68.48	2 15.36	0.390
Frid.	3	4 45 44.74	10.263	22 21 20.4	18.19	15 48.11	68.53	2 5.80	0.405
Sat.	4	4 49 51.25	10.278	22 28 25.3	+17.21	15 47.98	68.58	1 55.87	0.420
SUN.	5	4 53 58.11	10.292	22 35 6.6	16.23	15 47.86	68.63	1 45.59	0.435
Mon.	6	4 58 5.29	10.306	22 41 24.3	15.24	15 47.74	68.67	1 35.00	0.448
Tues.	7	5 2 12.79	10.319	22 47 18.1	+14.24	15 47.62	68.71	1 24.09	0.461
Wed.	8	5 6 20.59	10.331	22 52 48.0	13.24	15 47.51	68.75	1 12.88	0.473
Thur.	9	5 10 28.67	10.342	22 57 53.8	12.24	15 47.40	68.78	1 1.39	0.485
Frid.	10	5 14 37.02	10.353	23 2 35.3	+11.23	15 47.29	68.81	0 49.62	0.495
Sat.	11	5 18 45.61	10.362	23 6 52.6	10.21	15 47.19	68.84	0 37.63	0.504
SUN.	12	5 22 54.43	10.371	23 10 45.5	9.19	15 47.09	68.87	0 25.41	0.513
Mon.	13	5 27 3.44	10.379	23 14 13.8	+ 8.17	15 47.00	68.89	0 12.98	0.521
Tues.	14	5 31 12.64	10.386	23 17 17.6	7.14	15 46.91	68.91	0 0.38	0.528
Wed.	15	5 35 21.99	10.392	23 19 56.7	6.11	15 46.82	68.92	0 12.37	0.534
Thur.	16	5 39 31.46	10.397	23 22 11.0	+ 5.08	15 46.74	68.93	0 25.26	0.538
Frid.	17	5 43 41.04	10.401	23 24 0.6	4.05	15 46.67	68.94	0 38.25	0.542
Sat.	18	5 47 50.68	10.403	23 25 25.4	3.02	15 46.60	68.95	0 51.29	0.545
SUN.	19	5 52 0.37	10.404	23 26 25.4	+ 1.99	15 46.54	68.96	1 4.39	0.546
Mon.	20	5 56 10.08	10.404	23 27 0.6	+ 0.95	15 46.48	68.96	1 17.50	0.546
Tues.	21	6 0 19.78	10.403	23 27 10.9	- 0.09	15 46.43	68.96	1 30.61	0.545
Wed.	22	6 4 29.44	10.401	23 26 56.4	- 1.12	15 46.39	68.95	1 43.68	0.543
Thur.	23	6 8 39.04	10.398	23 26 17.1	2.16	15 46.35	68.94	1 56.68	0.540
Frid.	24	6 12 48.54	10.393	23 25 13.0	3.19	15 46.31	68.93	2 9.59	0.535
Sat.	25	6 16 57.92	10.387	23 23 44.2	- 4.22	15 46.28	68.92	2 22.37	0.530
SUN.	26	6 21 7.16	10.381	23 21 50.8	5.24	15 46.26	68.90	2 35.02	0.524
Mon.	27	6 25 16.23	10.374	23 19 32.7	6.26	15 46.24	68.88	2 47.49	0.516
Tues.	28	6 29 25.12	10.366	23 16 50.1	- 7.28	15 46.22	68.86	2 59.80	0.507
Wed.	29	6 33 33.79	10.356	23 13 43.0	8.30	15 46.21	68.83	3 11.87	0.498
Thur.	30	6 37 42.22	10.346	23 10 11.6	9.32	15 46.20	68.80	3 23.72	0.488
Frid.	31	6 41 50.41	10.335	N.23 6 15.9	-10.32	15 46.19	68.77	3 35.32	0.478

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sidereal time.

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign — indicates that north declinations are decreasing.

## AT GREENWICH MEAN NOON.

AT GREENWICH MEAN NOON.								
Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Subtracted from Mean Time.		
Wed.	1	h m s 4 37 33.23	s 10.231	N.22 6 1.6	" +20.12	m s 2 24.53	s 0.375	h m s 4 39 57.76
Thur.	2	4 41 38.98	10.247	22 13 53.0	19.16	2 15.34	0.390	4 43 54.32
Frid.	3	4 45 45.10	10.262	22 21 21.1	18.19	2 5.78	0.405	4 47 50.88
Sat.	4	4 49 51.58	10.277	22 28 25.9	+17.21	1 55.86	0.420	4 51 47.44
SUN.	5	4 53 58.41	10.291	22 35 7.1	16.22	1 45.58	0.435	4 55 43.99
Mon.	6	4 58 5.56	10.305	22 41 24.7	15.23	1 34.99	0.448	4 59 40.55
Tues.	7	5 2 13.03	10.318	22 47 18.4	+14.24	1 24.08	0.461	5 3 37.11
Wed.	8	5 6 20.80	10.330	22 52 48.2	13.24	1 12.87	0.473	5 7 33.67
Thur.	9	5 10 28.85	10.341	22 57 54.0	12.23	1 1.38	0.485	5 11 30.23
Frid.	10	5 14 37.17	10.351	23 2 35.5	+11.22	0 49.61	0.495	5 15 26.78
Sat.	11	5 18 45.72	10.361	23 6 52.7	10.21	0 37.62	0.504	5 19 23.34
SUN.	12	5 22 54.50	10.370	23 10 45.6	9.19	0 25.40	0.513	5 23 19.90
Mon.	13	5 27 3.48	10.378	23 14 13.9	+ 8.17	0 12.98	0.521	5 27 16.46
Tues.	14	5 31 12.64	10.385	23 17 17.6	7.14	0 0.38	0.528	5 31 13.02
Wed.	15	5 35 21.95	10.391	23 19 56.7	6.11	0 12.37	0.534	5 35 9.58
Thur.	16	5 39 31.39	10.395	23 22 11.0	+ 5.08	0 25.26	0.538	5 39 6.13
Frid.	17	5 43 40.93	10.398	23 24 0.6	4.05	0 38.24	0.542	5 43 2.69
Sat.	18	5 47 50.53	10.400	23 25 25.4	3.02	0 51.28	0.545	5 46 59.25
SUN.	19	5 52 0.19	10.402	23 26 25.4	+ 1.98	1 4.38	0.546	5 50 55.81
Mon.	20	5 56 9.86	10.403	23 27 0.6	+ 0.94	1 17.49	0.546	5 54 52.37
Tues.	21	6 0 19.52	10.402	23 27 10.9	- 0.09	1 30.60	0.545	5 58 48.92
Wed.	22	6 4 29.14	10.400	23 26 56.4	- 1.12	1 43.66	0.543	6 2 45.48
Thur.	23	6 8 38.70	10.397	23 26 17.2	2.15	1 56.66	0.540	6 6 42.04
Frid.	24	6 12 48.17	10.392	23 25 13.1	3.18	2 9.57	0.535	6 10 38.60
Sat.	25	6 16 57.51	10.386	23 23 44.4	- 4.21	2 22.35	0.530	6 14 35.16
SUN.	26	6 21 6.72	10.380	23 21 51.0	5.24	2 35.00	0.524	6 18 31.72
Mon.	27	6 25 15.75	10.373	23 19 33.0	6.26	2 47.47	0.516	6 22 28.28
Tues.	28	6 29 24.60	10.364	23 16 50.5	- 7.28	2 59.77	0.507	6 26 24.83
Wed.	29	6 33 33.23	10.355	23 13 43.5	8.30	3 11.84	0.498	6 30 21.39
Thur.	30	6 37 41.64	10.345	23 10 12.1	9.31	3 23.69	0.488	6 34 17.95
Frid.	31	6 41 49.80	10.334	N.23 6 16.5	-10.32	3 35.29	0.478	6 38 14.51

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign — indicates that north declinations are decreasing.

Diff. for 1 Hour,  
+ 9".8565.  
(Table III.)

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
 The sign + prefixed to the hourly change of declination indicates that north declinations are increasing; the sign — indicates that north declinations are decreasing.

Diff. for 1 Hour,  
 + 9.8565.  
 (Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	152	70 58 9.9	57 33.5	143.62	— 0.69	0.0062006	+25.1	h m s 19 16 52.19
2	153	71 55 36.2	54 59.7	143.57	0.64	0.0062601	24.6	19 12 56.28
3	154	72 53 1.2	52 24.5	143.53	0.57	0.0063186	24.1	19 9 0.37
4	155	73 50 25.4	49 48.5	143.49	— 0.46	0.0063756	+23.6	19 5 4.46
5	156	74 47 48.7	47 11.6	143.45	0.35	0.0064314	23.1	19 1 8.54
6	157	75 45 11.1	44 33.8	143.42	0.22	0.0064861	22.6	18 57 12.63
7	158	76 42 32.9	41 55.5	143.39	— 0.09	0.0065394	+22.0	18 53 16.72
8	159	77 39 53.9	39 16.3	143.37	+ 0.04	0.0065913	21.4	18 49 20.81
9	160	78 37 14.5	36 36.7	143.35	0.16	0.0066418	20.7	18 45 24.90
10	161	79 34 34.6	33 56.6	143.33	+ 0.26	0.0066906	+20.0	18 41 28.98
11	162	80 31 54.1	31 15.9	143.31	0.35	0.0067377	19.2	18 37 33.07
12	163	81 29 13.3	28 35.0	143.29	0.40	0.0067829	18.4	18 33 37.16
13	164	82 26 32.1	25 53.6	143.27	+ 0.43	0.0068262	+17.5	18 29 41.25
14	165	83 23 50.5	23 11.8	143.26	0.43	0.0068671	16.6	18 25 45.34
15	166	84 21 8.6	20 29.7	143.25	0.40	0.0069059	15.6	18 21 49.42
16	167	85 18 26.3	17 47.2	143.23	+ 0.34	0.0069421	+14.6	18 17 53.51
17	168	86 15 43.7	15 4.5	143.21	0.25	0.0069760	13.6	18 13 57.60
18	169	87 13 0.6	12 21.2	143.19	0.14	0.0070073	12.5	18 10 1.69
19	170	88 10 17.1	9 37.5	143.18	+ 0.02	0.0070361	+11.4	18 6 5.77
20	171	89 7 33.2	6 53.4	143.16	— 0.11	0.0070621	10.3	18 2 9.86
21	172	90 4 48.7	4 8.7	143.14	0.24	0.0070856	9.2	17 58 13.95
22	173	91 2 3.8	1 23.7	143.12	— 0.36	0.0071065	+ 8.2	17 54 18.04
23	174	91 59 18.4	58 38.1	143.10	0.48	0.0071250	7.2	17 50 22.12
24	175	92 56 32.5	55 52.0	143.08	0.57	0.0071410	6.2	17 46 26.21
25	176	93 53 45.9	53 5.2	143.05	— 0.65	0.0071548	+ 5.3	17 42 30.30
26	177	94 50 3.9	50 18.0	143.03	0.69	0.0071663	4.4	17 38 34.39
27	178	95 48 11.4	47 30.4	143.01	0.71	0.0071757	3.6	17 34 38.48
28	179	96 45 23.5	44 42.3	142.99	— 0.68	0.0071834	+ 2.8	17 30 42.56
29	180	97 42 35.1	41 53.7	142.98	0.63	0.0071892	2.0	17 26 46.65
30	181	98 39 46.4	39 4.8	142.97	0.56	0.0071932	1.4	17 22 50.74
31	182	99 36 57.5	36 15.7	142.96	— 0.47	0.0071958	+ 0.8	17 18 54.83
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 Hour, —9 <sup>h</sup> .8296. (Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	16 12.1	16 19.3	59 21.2	+2.25	59 47.5	+2.10	9 16.9	2.30	12.0
2	16 25.9	16 31.7	60 11.7	1.90	60 33.0	1.63	10 14.8	2.52	13.0
3	16 36.5	16 40.2	60 50.7	1.30	61 4.3	0.95	11 17.6	2.70	14.0
4	16 42.7	16 43.8	61 13.4	+0.56	61 17.7	+0.15	12 23.5	2.77	15.0
5	16 43.7	16 42.2	61 17.0	-0.26	61 11.5	-0.65	13 29.4	2.70	16.0
6	16 39.4	16 35.5	61 1.3	1.02	60 47.1	1.34	14 32.2	2.52	17.0
7	16 30.6	16 24.9	60 29.1	-1.63	60 8.1	-1.85	15 30.2	2.31	18.0
8	16 18.5	16 11.7	59 44.8	2.01	59 19.8	2.13	16 23.3	2.12	19.0
9	16 4.6	15 57.4	58 53.6	2.20	58 27.1	2.21	17 12.3	1.97	20.0
10	15 50.2	15 43.1	58 0.5	-2.19	57 34.5	-2.13	17 58.4	1.89	21.0
11	15 36.2	15 29.7	57 9.4	2.05	56 45.4	1.94	18 43.2	1.85	22.0
12	15 23.6	15 17.9	56 22.9	1.81	56 1.9	1.68	19 27.6	1.86	23.0
13	15 12.6	15 7.8	55 42.5	-1.54	55 24.9	-1.40	20 12.7	1.90	24.0
14	15 3.5	14 59.6	55 9.0	1.25	54 54.8	1.11	20 59.1	1.97	25.0
15	14 56.2	14 53.2	54 42.3	0.98	54 31.4	0.84	21 47.1	2.03	26.0
16	14 50.7	14 48.6	54 22.1	-0.71	54 14.3	-0.59	22 36.6	2.08	27.0
17	14 46.8	14 45.5	54 8.0	0.47	54 3.0	0.36	23 26.8	2.11	28.0
18	14 44.5	14 43.9	53 59.4	0.24	53 57.2	-0.13	6		29.0
19	14 43.7	14 43.8	53 56.3	-0.02	53 56.7	+0.10	0 16.8	2.07	0.3
20	14 44.3	14 45.2	53 58.6	+0.21	54 1.8	0.33	1 5.7	2.00	1.3
21	14 46.4	14 48.1	54 6.5	0.45	54 12.7	0.58	1 52.9	1.92	2.3
22	14 50.3	14 52.8	54 20.5	+0.72	54 30.0	+0.87	2 38.1	1.85	3.3
23	14 55.9	14 59.5	54 41.3	1.02	54 54.4	1.17	3 21.7	1.79	4.3
24	15 3.5	15 8.1	55 9.3	1.32	55 26.1	1.48	4 4.3	1.76	5.3
25	15 13.2	15 18.8	55 44.8	+1.64	56 5.4	+1.79	4 46.7	1.78	6.3
26	15 24.9	15 31.4	56 27.7	1.93	56 51.6	2.05	5 30.1	1.84	7.3
27	15 38.3	15 45.5	57 17.0	2.16	57 43.5	2.24	6 15.6	1.96	8.3
28	15 52.9	16 0.4	58 10.7	+2.28	58 38.3	+2.29	7 4.6	2.13	9.3
29	16 7.9	16 15.2	59 5.7	2.25	59 32.4	2.16	7 58.3	2.34	10.3
30	16 22.0	16 28.3	59 57.6	2.01	60 20.7	1.81	8 57.2	2.56	11.3
31	16 33.9	16 38.4	60 41.0	+1.55	60 57.8	+1.23	10 0.7	2.72	12.3

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 1.					FRIDAY 3.				
0	13 36 39.37	2.3067	S. 15 33 29.3	12.463	0	15 36 37.24	2.6830	S. 23 30 43.7	6.656
1	13 38 58.00	2.3144	15 45 54.9	12.388	1	15 39 18.42	2.6895	23 37 18.0	6.487
2	13 41 17.10	2.3222	15 58 15.9	12.312	2	15 41 59.98	2.6958	23 43 42.1	6.316
3	13 43 36.67	2.3302	16 10 32.3	12.234	3	15 44 41.92	2.7021	23 49 55.9	6.144
4	13 45 56.72	2.3381	16 22 44.0	12.154	4	15 47 24.23	2.7082	23 55 59.4	5.971
5	13 48 17.24	2.3460	16 34 50.8	12.072	5	15 50 6.90	2.7141	24 1 52.4	5.796
6	13 50 38.24	2.3540	16 46 52.6	11.988	6	15 52 49.92	2.7199	24 7 34.9	5.620
7	13 52 59.72	2.3620	16 58 49.4	11.902	7	15 55 33.29	2.7256	24 13 6.8	5.442
8	13 55 21.68	2.3701	17 10 40.9	11.814	8	15 58 16.99	2.7311	24 18 28.0	5.263
9	13 57 44.13	2.3782	17 22 27.1	11.725	9	16 1 1.02	2.7365	24 23 38.4	5.082
10	14 0 7.07	2.3863	17 34 7.9	11.633	10	16 3 45.37	2.7417	24 28 37.8	4.899
11	14 2 30.49	2.3944	17 45 43.1	11.539	11	16 6 30.03	2.7468	24 33 26.3	4.716
12	14 4 54.40	2.4026	17 57 12.6	11.444	12	16 9 14.99	2.7517	24 38 3.7	4.531
13	14 7 18.80	2.4108	18 8 36.4	11.347	13	16 12 0.24	2.7565	24 42 30.0	4.344
14	14 9 43.70	2.4191	18 19 54.2	11.247	14	16 14 45.77	2.7610	24 46 45.0	4.157
15	14 12 9.09	2.4273	18 31 6.0	11.145	15	16 17 31.56	2.7653	24 50 48.8	3.969
16	14 14 34.97	2.4355	18 42 11.6	11.041	16	16 20 17.61	2.7696	24 54 41.3	3.779
17	14 17 1.35	2.4437	18 53 10.9	10.935	17	16 23 3.91	2.7736	24 58 22.3	3.588
18	14 19 28.22	2.4520	19 4 3.8	10.827	18	16 25 50.44	2.7774	25 1 51.8	3.396
19	14 21 55.59	2.4602	19 14 50.1	10.717	19	16 28 37.20	2.7811	25 5 9.8	3.203
20	14 24 23.45	2.4684	19 25 29.8	10.605	20	16 31 24.17	2.7845	25 8 16.2	3.009
21	14 26 51.80	2.4767	19 36 2.7	10.490	21	16 34 11.34	2.7877	25 11 10.9	2.815
22	14 29 20.65	2.4849	19 46 28.6	10.373	22	16 36 58.70	2.7908	25 13 54.0	2.620
23	14 31 49.99	2.4931	S. 19 56 47.5	10.256	23	16 39 46.24	2.7937	S. 25 16 25.3	2.423
THURSDAY 2.					SATURDAY 4.				
0	14 34 19.82	2.5013	S. 20 6 59.3	10.137	0	16 42 33.95	2.7964	S. 25 18 44.7	2.225
1	14 36 50.14	2.5095	20 17 3.9	10.014	1	16 45 21.81	2.7989	25 20 52.3	2.028
2	14 39 20.96	2.5177	20 27 1.0	9.890	2	16 48 9.82	2.8012	25 22 48.1	1.830
3	14 41 52.26	2.5257	20 36 50.7	9.764	3	16 50 57.95	2.8032	25 24 31.9	1.631
4	14 44 24.05	2.5338	20 46 32.7	9.635	4	16 53 46.20	2.8051	25 26 3.8	1.432
5	14 46 56.32	2.5419	20 56 6.9	9.504	5	16 56 34.56	2.8067	25 27 23.7	1.231
6	14 49 29.08	2.5500	21 5 33.2	9.372	6	16 59 23.01	2.8081	25 28 31.5	1.031
7	14 52 2.32	2.5579	21 14 51.6	9.238	7	17 2 11.53	2.8093	25 29 27.4	0.831
8	14 54 36.03	2.5658	21 24 1.8	9.101	8	17 5 0.12	2.8103	25 30 11.2	0.630
9	14 57 10.22	2.5737	21 33 3.7	8.962	9	17 7 48.77	2.8112	25 30 43.0	0.429
10	14 59 44.88	2.5816	21 41 57.3	8.822	10	17 10 37.46	2.8118	25 31 2.7	0.227
11	15 2 20.01	2.5894	21 50 42.4	8.680	11	17 13 26.18	2.8122	25 31 10.3	- 0.026
12	15 4 55.61	2.5971	21 59 18.9	8.536	12	17 16 14.92	2.8123	25 31 5.8	+ 0.176
13	15 7 31.66	2.6047	22 7 46.7	8.389	13	17 19 3.66	2.8122	25 30 49.2	0.377
14	15 10 8.17	2.6122	22 16 5.6	8.241	14	17 21 52.39	2.8120	25 30 20.5	0.579
15	15 12 45.13	2.6197	22 24 15.6	8.091	15	17 24 41.10	2.8116	25 29 39.7	0.780
16	15 15 22.54	2.6272	22 32 16.5	7.938	16	17 27 29.78	2.8108	25 28 46.9	0.981
17	15 18 0.39	2.6345	22 40 8.2	7.784	17	17 30 18.40	2.8098	25 27 42.0	1.182
18	15 20 38.68	2.6417	22 47 50.6	7.628	18	17 33 6.96	2.8087	25 26 25.1	1.382
19	15 23 17.40	2.6489	22 55 23.6	7.471	19	17 35 55.45	2.8074	25 24 56.1	1.583
20	15 25 56.55	2.6559	23 2 47.1	7.311	20	17 38 43.85	2.8059	25 23 15.1	1.782
21	15 28 36.11	2.6628	23 10 0.9	7.149	21	17 41 32.16	2.8042	25 21 22.2	1.982
22	15 31 16.08	2.6696	23 17 5.0	6.987	22	17 44 20.36	2.8022	25 19 17.3	2.182
23	15 33 56.46	2.6763	23 23 59.3	6.823	23	17 47 8.43	2.8001	25 17 0.4	2.380
24	15 36 37.24	2.6830	S. 23 30 43.7	6.656	24	17 49 56.37	2.7977	S. 25 14 31.7	2.577



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 5.					TUESDAY 7.				
0	17 49 56.37	2.7977	S. 25 14 31.7	2.577	0	19 58 25.09	2.5112	S. 19 45 48.8	10.493
1	17 52 44.16	2.7932	25 11 51.1	2.775	1	20 0 55.52	2.5032	19 35 15.6	10.613
2	17 55 31.79	2.7924	25 8 58.7	2.971	2	20 3 25.48	2.4933	19 24 35.2	10.732
3	17 58 19.23	2.7893	25 5 54.6	3.166	3	20 5 54.96	2.4873	19 13 47.7	10.849
4	18 1 6.53	2.7863	25 2 38.8	3.361	4	20 8 23.96	2.4794	19 2 53.3	10.962
5	18 3 53.61	2.7829	24 59 11.3	3.555	5	20 10 52.49	2.4714	18 51 52.2	11.074
6	18 6 40.48	2.7794	24 55 32.2	3.747	6	20 13 20.53	2.4634	18 40 44.4	11.184
7	18 9 27.14	2.7757	24 51 41.6	3.939	7	20 15 48.10	2.4555	18 29 30.1	11.292
8	18 12 13.57	2.7719	24 47 39.5	4.130	8	20 18 15.19	2.4475	18 18 9.3	11.399
9	18 14 59.77	2.7678	24 43 26.0	4.320	9	20 20 41.80	2.4395	18 6 42.2	11.503
10	18 17 45.71	2.7636	24 39 1.1	4.508	10	20 23 7.93	2.4316	17 55 9.0	11.604
11	18 20 31.40	2.7592	24 34 25.0	4.696	11	20 25 33.59	2.4237	17 43 29.7	11.704
12	18 23 16.82	2.7546	24 29 37.6	4.882	12	20 27 58.77	2.4157	17 31 44.5	11.802
13	18 26 1.95	2.7498	24 24 39.1	5.068	13	20 30 23.48	2.4078	17 19 53.4	11.898
14	18 28 46.80	2.7449	24 19 29.5	5.252	14	20 32 47.71	2.4000	17 7 56.7	11.992
15	18 31 31.34	2.7398	24 14 8.9	5.433	15	20 35 11.48	2.3922	16 55 54.4	12.084
16	18 34 15.57	2.7346	24 8 37.5	5.614	16	20 37 34.78	2.3844	16 43 46.6	12.174
17	18 36 59.49	2.7292	24 2 55.2	5.794	17	20 39 57.61	2.3766	16 31 33.5	12.262
18	18 39 43.08	2.7237	23 57 2.2	5.972	18	20 42 19.97	2.3689	16 19 15.1	12.348
19	18 42 26.34	2.7181	23 50 58.5	6.149	19	20 44 41.83	2.3612	16 6 51.7	12.432
20	18 45 9.25	2.7122	23 44 44.3	6.323	20	20 47 3.32	2.3535	15 54 23.3	12.514
21	18 47 51.81	2.7063	23 38 19.7	6.497	21	20 49 24.30	2.3459	15 41 50.0	12.594
22	18 50 34.01	2.7003	23 31 44.7	6.669	22	20 51 44.83	2.3384	15 29 12.0	12.672
23	18 53 15.85	2.6942	S. 23 24 59.4	6.839	23	20 54 4.91	2.3308	S. 15 16 29.3	12.749
MONDAY 6.					WEDNESDAY 8.				
0	18 55 57.31	2.6878	S. 23 18 4.0	7.007	0	20 56 24.53	2.3233	S. 15 3 42.1	12.823
1	18 58 38.38	2.6813	23 10 58.5	7.174	1	20 58 43.71	2.3159	14 50 50.5	12.895
2	19 1 19.06	2.6748	23 3 43.1	7.339	2	21 1 2.44	2.3086	14 37 54.7	12.965
3	19 3 59.35	2.6682	22 56 17.8	7.503	3	21 3 20.74	2.3013	14 24 54.7	13.034
4	19 6 39.24	2.6614	22 48 42.7	7.665	4	21 5 38.60	2.2940	14 11 50.6	13.102
5	19 9 18.72	2.6546	22 40 58.0	7.824	5	21 7 56.02	2.2868	13 58 42.5	13.167
6	19 11 57.79	2.6477	22 33 3.8	7.982	6	21 10 13.02	2.2797	13 45 30.6	13.229
7	19 14 36.44	2.6406	22 25 0.1	8.138	7	21 12 29.59	2.2726	13 32 15.0	13.291
8	19 17 14.66	2.6334	22 16 47.2	8.292	8	21 14 45.73	2.2655	13 18 55.7	13.351
9	19 19 52.45	2.6262	22 8 25.0	8.445	9	21 17 1.45	2.2586	13 5 32.9	13.408
10	19 22 29.81	2.6189	21 59 53.8	8.595	10	21 19 16.76	2.2517	12 52 6.7	13.465
11	19 25 6.72	2.6116	21 51 13.6	8.744	11	21 21 31.66	2.2449	12 38 37.1	13.520
12	19 27 43.20	2.6042	21 42 24.5	8.891	12	21 23 46.15	2.2382	12 25 4.3	13.572
13	19 30 19.23	2.5967	21 33 26.7	9.035	13	21 26 0.24	2.2315	12 11 28.5	13.622
14	19 32 54.80	2.5891	21 24 20.3	9.177	14	21 28 13.93	2.2248	11 57 49.6	13.672
15	19 35 29.92	2.5815	21 15 5.4	9.318	15	21 30 27.22	2.2182	11 44 7.8	13.720
16	19 38 4.58	2.5738	21 5 42.1	9.457	16	21 32 40.12	2.2118	11 30 23.2	13.766
17	19 40 38.78	2.5662	20 56 10.6	9.593	17	21 34 52.64	2.2055	11 16 35.9	13.810
18	19 43 12.52	2.5584	20 46 30.9	9.728	18	21 37 4.78	2.1992	11 2 46.0	13.853
19	19 45 45.79	2.5506	20 36 43.2	9.861	19	21 39 16.54	2.1929	10 48 53.5	13.894
20	19 48 18.59	2.5428	20 26 47.6	9.991	20	21 41 27.93	2.1867	10 34 58.7	13.933
21	19 50 50.93	2.5350	20 16 44.3	10.119	21	21 43 38.95	2.1806	10 21 1.5	13.972
22	19 53 22.79	2.5271	20 6 33.3	10.246	22	21 45 49.60	2.1746	10 7 2.1	14.008
23	19 55 54.18	2.5192	19 56 14.8	10.371	23	21 47 59.90	2.1687	9 53 0.6	14.043
24	19 58 25.09	2.5112	S. 19 45 48.8	10.493	24	21 50 9.84	2.1628	S. 9 38 57.0	14.076

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 9.					SATURDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	21 50 9.84	2.1628	S. 9 38 57.0	14.076	0	23 28 48.49	1.9796	N. 1 49 11.5	14.141
1	21 52 19.43	2.1570	9 24 51.5	14.107	1	23 30 47.21	1.9778	2 3 19.2	14.115
2	21 54 28.68	2.1513	9 10 44.2	14.137	2	23 32 45.83	1.9762	2 17 25.3	14.088
3	21 56 37.59	2.1457	8 56 35.1	14.166	3	23 34 44.35	1.9745	2 31 29.8	14.062
4	21 58 46.17	2.1402	8 42 24.3	14.193	4	23 36 42.77	1.9729	2 45 32.7	14.033
5	22 0 54.41	2.1347	8 28 11.9	14.218	5	23 38 41.10	1.9714	2 59 33.8	14.004
6	22 3 2.33	2.1293	8 13 58.1	14.243	6	23 40 39.34	1.9700	3 13 33.2	13.974
7	22 5 9.93	2.1240	7 59 42.8	14.266	7	23 42 37.50	1.9687	3 27 30.7	13.943
8	22 7 17.21	2.1188	7 45 26.2	14.287	8	23 44 35.58	1.9674	3 41 26.4	13.912
9	22 9 24.18	2.1137	7 31 8.4	14.307	9	23 46 33.59	1.9662	3 55 20.1	13.879
10	22 11 30.85	2.1087	7 16 49.4	14.326	10	23 48 31.53	1.9652	4 9 11.9	13.846
11	22 13 37.22	2.1037	7 2 29.3	14.343	11	23 50 29.41	1.9642	4 23 1.6	13.812
12	22 15 43.30	2.0989	6 48 8.2	14.359	12	23 52 27.23	1.9632	4 36 49.3	13.777
13	22 17 49.09	2.0941	6 33 46.2	14.373	13	23 54 24.99	1.9623	4 50 34.8	13.740
14	22 19 54.59	2.0893	6 19 23.4	14.387	14	23 56 22.70	1.9615	5 4 18.1	13.703
15	22 21 59.81	2.0847	6 4 59.8	14.399	15	23 58 20.37	1.9607	5 17 59.2	13.666
16	22 24 4.75	2.0802	5 50 35.5	14.410	16	0 0 17.99	1.9601	5 31 38.0	13.627
17	22 26 9.43	2.0757	5 36 10.6	14.419	17	0 2 15.58	1.9596	5 45 14.5	13.588
18	22 28 13.84	2.0714	5 21 45.2	14.427	18	0 4 13.14	1.9590	5 58 48.6	13.547
19	22 30 18.00	2.0672	5 7 19.3	14.434	19	0 6 10.66	1.9585	6 12 20.2	13.507
20	22 32 21.90	2.0629	4 52 53.1	14.439	20	0 8 8.16	1.9581	6 25 49.4	13.465
21	22 34 25.55	2.0588	4 38 26.6	14.444	21	0 10 5.63	1.9578	6 39 16.0	13.422
22	22 36 28.96	2.0547	4 23 59.8	14.447	22	0 12 3.09	1.9576	6 52 40.0	13.378
23	22 38 32.12	2.0508	S. 4 9 32.9	14.448	23	0 14 0.54	1.9574	N. 7 6 1.4	13.334
FRIDAY 10.					SUNDAY 12.				
0	22 40 35.06	2.0471	S. 3 55 6.0	14.449	0	0 15 57.98	1.9573	N. 7 19 20.1	13.289
1	22 42 37.77	2.0432	3 40 39.0	14.449	1	0 17 55.42	1.9574	7 32 36.1	13.243
2	22 44 40.25	2.0395	3 26 12.1	14.447	2	0 19 52.85	1.9572	7 45 49.3	13.197
3	22 46 42.51	2.0359	3 11 45.3	14.445	3	0 21 50.28	1.9573	7 58 59.7	13.149
4	22 48 44.56	2.0324	2 57 18.7	14.441	4	0 23 47.72	1.9575	8 12 7.2	13.101
5	22 50 46.40	2.0290	2 42 52.4	14.436	5	0 25 45.18	1.9577	8 25 11.8	13.052
6	22 52 48.04	2.0257	2 28 26.4	14.430	6	0 27 42.65	1.9580	8 38 13.4	13.002
7	22 54 49.48	2.0224	2 14 0.8	14.422	7	0 29 40.14	1.9583	8 51 12.0	12.951
8	22 56 50.73	2.0192	1 59 35.7	14.414	8	0 31 37.65	1.9587	9 4 7.5	12.900
9	22 58 51.79	2.0161	1 45 11.1	14.405	9	0 33 35.18	1.9591	9 17 0.0	12.848
10	23 0 52.66	2.0131	1 30 47.1	14.394	10	0 35 32.74	1.9597	9 29 49.3	12.795
11	23 2 53.36	2.0102	1 16 23.8	14.383	11	0 37 30.34	1.9603	9 42 35.4	12.741
12	23 4 53.89	2.0074	1 2 1.1	14.371	12	0 39 27.97	1.9609	9 55 18.2	12.687
13	23 6 54.25	2.0046	0 47 39.3	14.357	13	0 41 25.65	1.9617	10 7 57.8	12.632
14	23 8 54.44	2.0019	0 33 18.3	14.342	14	0 43 23.37	1.9624	10 20 34.0	12.576
15	23 10 54.48	1.9993	0 18 58.2	14.327	15	0 45 21.14	1.9632	10 33 6.9	12.519
16	23 12 54.36	1.9968	S. 0 4 39.1	14.310	16	0 47 18.96	1.9641	10 45 36.3	12.462
17	23 14 54.10	1.9944	N. 0 9 39.0	14.292	17	0 49 16.83	1.9650	10 58 2.3	12.403
18	23 16 53.69	1.9920	0 23 56.0	14.273	18	0 51 14.76	1.9660	11 10 24.7	12.344
19	23 18 53.14	1.9898	0 38 11.8	14.253	19	0 53 12.75	1.9671	11 22 43.6	12.285
20	23 20 52.46	1.9876	0 52 26.4	14.232	20	0 55 10.81	1.9682	11 34 58.9	12.224
21	23 22 51.65	1.9854	1 6 39.7	14.211	21	0 57 8.94	1.9693	11 47 10.5	12.163
22	23 24 50.71	1.9834	1 20 51.7	14.188	22	0 59 7.13	1.9705	11 59 18.5	12.102
23	23 26 49.66	1.9815	1 35 2.3	14.165	23	1 1 5.40	1.9717	12 11 22.7	12.038
24	23 28 48.49	1.9796	N. 1 49 11.5	14.141	24	1 3 3.74	1.9730	N. 12 23 23.1	11.975

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 13.					WEDNESDAY 15.				
0	1 3 3.74	1.9730	N.12 23 23.1	11.975	0	2 40 1.42	2.0773	N.20 31 34.7	8.099
1	1 5 2.16	1.9744	12 35 19.7	11.911	1	2 42 6.14	2.0800	20 39 37.7	8.001
2	1 7 0.67	1.9758	12 47 12.4	11.846	2	2 44 11.02	2.0826	20 47 34.8	7.903
3	1 8 59.26	1.9772	12 59 1.2	11.781	3	2 46 16.05	2.0852	20 55 26.1	7.805
4	1 10 57.94	1.9787	13 10 46.1	11.715	4	2 48 21.24	2.0877	21 3 11.4	7.706
5	1 12 56.71	1.9803	13 22 27.0	11.647	5	2 50 26.58	2.0903	21 10 50.8	7.607
6	1 14 55.58	1.9820	13 34 3.8	11.579	6	2 52 32.08	2.0929	21 18 24.2	7.506
7	1 16 54.55	1.9836	13 45 36.5	11.511	7	2 54 37.73	2.0955	21 25 51.5	7.404
8	1 18 53.61	1.9852	13 57 5.1	11.442	8	2 56 43.54	2.0981	21 33 12.7	7.302
9	1 20 52.78	1.9870	14 8 29.5	11.372	9	2 58 49.50	2.1006	21 40 27.8	7.200
10	1 22 52.05	1.9887	14 19 49.7	11.301	10	3 0 55.61	2.1032	21 47 36.7	7.097
11	1 24 51.42	1.9905	14 31 5.6	11.229	11	3 3 1.88	2.1057	21 54 39.5	6.995
12	1 26 50.91	1.9924	14 42 17.2	11.157	12	3 5 8.29	2.1082	22 1 36.1	6.891
13	1 28 50.51	1.9943	14 53 24.5	11.085	13	3 7 14.86	2.1107	22 8 26.4	6.786
14	1 30 50.22	1.9962	15 4 27.4	11.011	14	3 9 21.58	2.1132	22 15 10.4	6.681
15	1 32 50.05	1.9982	15 15 25.8	10.937	15	3 11 28.44	2.1156	22 21 48.1	6.575
16	1 34 50.00	2.0002	15 26 19.8	10.862	16	3 13 35.45	2.1181	22 28 19.4	6.468
17	1 36 50.07	2.0022	15 37 9.3	10.787	17	3 15 42.61	2.1205	22 34 44.3	6.362
18	1 38 50.27	2.0043	15 47 54.2	10.710	18	3 17 49.91	2.1229	22 41 2.8	6.255
19	1 40 50.59	2.0064	15 58 34.5	10.633	19	3 19 57.36	2.1253	22 47 14.9	6.147
20	1 42 51.04	2.0085	16 9 10.2	10.556	20	3 22 4.95	2.1277	22 53 20.5	6.038
21	1 44 51.61	2.0107	16 19 41.2	10.477	21	3 24 12.68	2.1299	22 59 19.5	5.929
22	1 46 52.32	2.0129	16 30 7.5	10.398	22	3 26 20.54	2.1322	23 5 12.0	5.820
23	1 48 53.16	2.0152	N.16 40 29.0	10.318	23	3 28 28.54	2.1344	N.23 10 57.9	5.710
TUESDAY 14.					THURSDAY 16.				
0	1 50 54.14	2.0175	N.16 50 45.7	10.237	0	3 30 36.67	2.1367	N.23 16 37.2	5.599
1	1 52 55.26	2.0197	17 0 57.5	10.157	1	3 32 44.94	2.1389	23 22 9.8	5.488
2	1 54 56.51	2.0220	17 11 4.5	10.075	2	3 34 53.34	2.1411	23 27 35.8	5.377
3	1 56 57.90	2.0243	17 21 6.5	9.992	3	3 37 1.87	2.1433	23 32 55.1	5.266
4	1 58 59.43	2.0267	17 31 3.5	9.908	4	3 39 10.53	2.1455	23 38 7.7	5.153
5	2 1 1.11	2.0292	17 40 55.5	9.824	5	3 41 19.31	2.1477	23 43 13.5	5.041
6	2 3 2.93	2.0316	17 50 42.4	9.739	6	3 43 28.21	2.1499	23 48 12.6	4.927
7	2 5 4.90	2.0340	18 0 24.2	9.654	7	3 45 37.24	2.1514	23 53 4.8	4.813
8	2 7 7.01	2.0364	18 10 0.9	9.568	8	3 47 46.38	2.1533	23 57 50.2	4.699
9	2 9 9.27	2.0388	18 19 32.4	9.482	9	3 49 55.64	2.1552	24 2 28.7	4.585
10	2 11 11.67	2.0413	18 28 58.7	9.394	10	3 52 5.01	2.1571	24 7 0.4	4.471
11	2 13 14.23	2.0439	18 38 19.7	9.305	11	3 54 14.49	2.1589	24 11 25.2	4.355
12	2 15 16.94	2.0464	18 47 35.3	9.216	12	3 56 24.08	2.1607	24 15 43.0	4.239
13	2 17 19.80	2.0489	18 56 45.6	9.127	13	3 58 33.78	2.1625	24 19 53.9	4.123
14	2 19 22.81	2.0515	19 5 50.6	9.037	14	4 0 43.58	2.1642	24 23 57.8	4.007
15	2 21 25.98	2.0541	19 14 50.1	8.946	15	4 2 53.48	2.1657	24 27 54.7	3.890
16	2 23 29.30	2.0566	19 23 44.1	8.854	16	4 5 3.47	2.1673	24 31 44.6	3.772
17	2 25 32.77	2.0592	19 32 32.6	8.762	17	4 7 13.56	2.1689	24 35 27.4	3.654
18	2 27 36.40	2.0617	19 41 15.6	8.670	18	4 9 23.74	2.1704	24 39 3.1	3.537
19	2 29 40.18	2.0642	19 49 53.0	8.576	19	4 11 34.01	2.1718	24 42 31.8	3.419
20	2 31 44.11	2.0668	19 58 24.7	8.482	20	4 13 44.36	2.1733	24 45 53.4	3.301
21	2 33 48.20	2.0695	20 6 50.8	8.387	21	4 15 54.80	2.1747	24 49 7.9	3.182
22	2 35 52.45	2.0722	20 15 11.2	8.292	22	4 18 5.32	2.1759	24 52 15.2	3.063
23	2 37 56.86	2.0747	20 23 25.8	8.196	23	4 20 15.91	2.1771	24 55 15.4	2.944
24	2 40 1.42	2.0773	N.20 31 34.7	8.099	24	4 22 26.57	2.1782	N.24 58 8.5	2.825

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 17.					SUNDAY 19.				
0	4 22 26.57	2.1782	N.24 58 8.5	2.825	0	6 7 11.90	2.1625	N.24 54 2.2	2.973
1	4 24 37.30	2.1794	25 0 54.4	2.704	1	6 9 21.60	2.1607	24 51 0.3	3.090
2	4 26 48.10	2.1805	25 3 33.0	2.584	2	6 11 31.19	2.1588	24 47 51.4	3.207
3	4 28 58.96	2.1815	25 6 4.5	2.464	3	6 13 40.66	2.1569	24 44 35.5	3.322
4	4 31 9.88	2.1824	25 8 28.7	2.343	4	6 15 50.02	2.1550	24 41 12.7	3.438
5	4 33 20.85	2.1833	25 10 45.7	2.223	5	6 17 59.26	2.1530	24 37 42.9	3.554
6	4 35 31.88	2.1842	25 12 55.5	2.102	6	6 20 8.38	2.1509	24 34 6.2	3.668
7	4 37 42.95	2.1849	25 14 58.0	1.981	7	6 22 17.37	2.1488	24 30 22.7	3.782
8	4 39 54.07	2.1857	25 16 53.2	1.859	8	6 24 26.24	2.1467	24 26 32.3	3.897
9	4 42 5.23	2.1863	25 18 41.1	1.738	9	6 26 34.97	2.1444	24 22 35.1	4.010
10	4 44 16.43	2.1869	25 20 21.8	1.617	10	6 28 43.57	2.1422	24 18 31.1	4.123
11	4 46 27.66	2.1873	25 21 55.2	1.495	11	6 30 52.03	2.1398	24 14 20.3	4.237
12	4 48 38.91	2.1878	25 23 21.2	1.373	12	6 33 0.35	2.1375	24 10 2.7	4.349
13	4 50 50.19	2.1883	25 24 40.0	1.252	13	6 35 8.53	2.1352	24 5 38.4	4.460
14	4 53 1.50	2.1887	25 25 51.4	1.130	14	6 37 16.57	2.1327	24 1 7.5	4.571
15	4 55 12.83	2.1889	25 26 55.6	1.008	15	6 39 24.46	2.1303	23 56 29.9	4.682
16	4 57 24.17	2.1891	25 27 52.4	0.886	16	6 41 32.20	2.1277	23 51 45.6	4.792
17	4 59 35.52	2.1892	25 28 41.9	0.764	17	6 43 39.79	2.1252	23 46 54.8	4.902
18	5 1 46.88	2.1893	25 29 24.1	0.642	18	6 45 47.23	2.1227	23 41 57.4	5.012
19	5 3 58.24	2.1893	25 29 58.9	0.519	19	6 47 54.51	2.1201	23 36 53.4	5.121
20	5 6 9.60	2.1892	25 30 26.4	0.397	20	6 50 1.64	2.1175	23 31 42.9	5.228
21	5 8 20.95	2.1892	25 30 46.6	0.275	21	6 52 8.61	2.1147	23 26 26.0	5.335
22	5 10 32.30	2.1891	25 30 59.4	0.152	22	6 54 15.41	2.1120	23 21 2.6	5.443
23	5 12 43.64	2.1888	N.25 31 4.9	+ 0.031	23	6 56 22.05	2.1092	N.23 15 32.8	5.549
SATURDAY 18.					MONDAY 20.				
0	5 14 54.96	2.1885	N.25 31 3.1	- 0.091	0	6 58 28.52	2.1065	N.23 9 56.7	5.655
1	5 17 6.26	2.1881	25 30 54.0	0.213	1	7 0 34.83	2.1037	23 4 14.2	5.761
2	5 19 17.53	2.1877	25 30 37.5	0.335	2	7 2 40.97	2.1009	22 58 25.4	5.865
3	5 21 28.78	2.1872	25 30 13.8	0.456	3	7 4 46.94	2.0981	22 52 30.4	5.969
4	5 23 40.00	2.1867	25 29 42.8	0.578	4	7 6 52.74	2.0952	22 46 29.1	6.073
5	5 25 51.18	2.1860	25 29 4.4	0.700	5	7 8 58.36	2.0922	22 40 21.6	6.177
6	5 28 2.32	2.1853	25 28 18.8	0.822	6	7 11 3.81	2.0893	22 34 7.9	6.279
7	5 30 13.42	2.1846	25 27 25.8	0.943	7	7 13 9.08	2.0864	22 27 48.1	6.381
8	5 32 24.47	2.1837	25 26 25.6	1.064	8	7 15 14.18	2.0835	22 21 22.2	6.482
9	5 34 35.47	2.1829	25 25 18.1	1.185	9	7 17 19.10	2.0806	22 14 50.2	6.583
10	5 36 46.42	2.1820	25 24 3.4	1.306	10	7 19 23.85	2.0776	22 8 12.2	6.683
11	5 38 57.31	2.1809	25 22 41.4	1.427	11	7 21 28.41	2.0745	22 1 28.2	6.782
12	5 41 8.13	2.1798	25 21 12.2	1.547	12	7 23 32.79	2.0715	21 54 38.3	6.881
13	5 43 18.89	2.1787	25 19 35.8	1.667	13	7 25 36.99	2.0685	21 47 42.5	6.979
14	5 45 29.58	2.1776	25 17 52.1	1.788	14	7 27 41.01	2.0654	21 40 40.8	7.077
15	5 47 40.20	2.1763	25 16 1.2	1.908	15	7 29 44.84	2.0623	21 33 33.3	7.173
16	5 49 50.74	2.1750	25 14 3.1	2.027	16	7 31 48.49	2.0593	21 26 20.0	7.269
17	5 52 1.20	2.1737	25 11 57.9	2.146	17	7 33 51.96	2.0562	21 19 1.0	7.365
18	5 54 11.58	2.1722	25 9 45.6	2.265	18	7 35 55.24	2.0532	21 11 36.2	7.460
19	5 56 21.87	2.1707	25 7 26.1	2.385	19	7 37 58.34	2.0501	21 4 5.8	7.554
20	5 58 32.07	2.1692	25 4 59.4	2.503	20	7 40 1.25	2.0470	20 56 29.7	7.648
21	6 0 42.18	2.1677	25 2 25.7	2.621	21	7 42 3.98	2.0439	20 48 48.0	7.741
22	6 2 52.19	2.1660	24 59 44.9	2.738	22	7 44 6.52	2.0408	20 41 0.8	7.833
23	6 5 2.10	2.1642	24 56 57.1	2.856	23	7 46 8.87	2.0377	20 33 8.1	7.924
24	6 7 11.90	2.1625	N.24 54 2.2	2.973	24	7 48 11.04	2.0346	N.20 25 9.9	8.015

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.
TUESDAY 21.					THURSDAY 23.			
0	7 48 11.04	2.0346	N. 20 25 9.9	8.015	0	9 22 32.92	1.9076	N. 12 29 13.6
1	7 50 13.02	2.0315	20 17 6.3	8.105	1	9 24 27.32	1.9058	12 17 39.3
2	7 52 14.82	2.0284	20 8 57.3	8.194	2	9 26 21.62	1.9042	12 6 1.6
3	7 54 16.43	2.0252	20 0 43.0	8.283	3	9 28 15.82	1.9024	11 54 20.6
4	7 56 17.85	2.0222	19 52 23.4	8.371	4	9 30 9.91	1.9007	11 42 36.4
5	7 58 19.09	2.0192	19 43 58.5	8.458	5	9 32 3.91	1.8992	11 30 48.9
6	8 0 20.15	2.0161	19 35 28.4	8.545	6	9 33 57.82	1.8977	11 18 58.3
7	8 2 21.02	2.0130	19 26 53.1	8.631	7	9 35 51.63	1.8961	11 7 4.5
8	8 4 21.71	2.0100	19 18 12.7	8.716	8	9 37 45.35	1.8947	10 55 7.6
9	8 6 22.22	2.0069	19 9 27.2	8.800	9	9 39 38.99	1.8932	10 43 7.7
10	8 8 22.54	2.0038	19 0 36.7	8.883	10	9 41 32.54	1.8919	10 31 4.7
11	8 10 22.68	2.0008	18 51 41.2	8.967	11	9 43 26.02	1.8907	10 18 58.8
12	8 12 22.64	1.9978	18 42 40.7	9.049	12	9 45 19.42	1.8894	10 6 50.0
13	8 14 22.42	1.9949	18 33 35.3	9.131	13	9 47 12.75	1.8882	9 54 38.3
14	8 16 22.03	1.9919	18 24 25.0	9.212	14	9 49 6.01	1.8871	9 42 23.7
15	8 18 21.45	1.9889	18 15 9.9	9.292	15	9 50 59.20	1.8860	9 30 6.3
16	8 20 20.70	1.9860	18 5 49.9	9.372	16	9 52 52.33	1.8851	9 17 46.2
17	8 22 19.77	1.9831	17 56 25.2	9.451	17	9 54 45.41	1.8842	9 5 23.3
18	8 24 18.67	1.9802	17 46 55.8	9.529	18	9 56 38.43	1.8832	8 52 57.8
19	8 26 17.40	1.9773	17 37 21.7	9.607	19	9 58 31.40	1.8824	8 40 29.7
20	8 28 15.95	1.9744	17 27 43.0	9.683	20	10 0 24.32	1.8817	8 27 58.9
21	8 30 14.33	1.9716	17 17 59.7	9.760	21	10 2 17.20	1.8809	8 15 25.6
22	8 32 12.54	1.9688	17 8 11.8	9.836	22	10 4 10.03	1.8802	8 2 49.8
23	8 34 10.58	1.9660	N. 16 58 19.4	9.910	23	10 6 2.83	1.8797	N. 7 50 11.5
WEDNESDAY 22.					FRIDAY 24.			
0	8 36 8.46	1.9633	N. 16 48 22.6	9.983	0	10 7 55.59	1.8792	N. 7 37 30.8
1	8 38 6.18	1.9606	16 38 21.4	10.057	1	10 9 48.33	1.8787	7 24 47.7
2	8 40 3.73	1.9578	16 28 15.8	10.129	2	10 11 41.04	1.8782	7 12 2.3
3	8 42 1.12	1.9552	16 18 5.9	10.202	3	10 13 33.72	1.8779	6 59 14.6
4	8 43 58.35	1.9526	16 7 51.7	10.272	4	10 15 26.39	1.8777	6 46 24.7
5	8 45 55.43	1.9500	15 57 33.2	10.342	5	10 17 19.05	1.8775	6 33 32.5
6	8 47 52.35	1.9474	15 47 10.6	10.412	6	10 19 11.69	1.8773	6 20 38.1
7	8 49 49.12	1.9449	15 36 43.8	10.481	7	10 21 4.33	1.8772	6 7 41.6
8	8 51 45.74	1.9424	15 26 12.9	10.549	8	10 22 56.96	1.8772	5 54 43.1
9	8 53 42.21	1.9399	15 15 37.9	10.617	9	10 24 49.59	1.8772	5 41 42.5
10	8 55 38.53	1.9374	15 4 58.9	10.683	10	10 26 42.23	1.8774	5 28 39.9
11	8 57 34.70	1.9351	14 54 15.9	10.750	11	10 28 34.88	1.8776	5 15 35.4
12	8 59 30.74	1.9328	14 43 28.9	10.815	12	10 30 27.54	1.8778	5 2 28.9
13	9 1 26.64	1.9305	14 32 38.1	10.879	13	10 32 20.22	1.8782	4 49 20.6
14	9 3 22.40	1.9282	14 21 43.4	10.943	14	10 34 12.92	1.8786	4 36 10.4
15	9 5 18.02	1.9259	14 10 44.9	11.007	15	10 36 5.65	1.8790	4 22 58.5
16	9 7 13.51	1.9238	13 59 42.6	11.069	16	10 37 58.40	1.8795	4 9 44.8
17	9 9 8.87	1.9216	13 48 36.6	11.131	17	10 39 51.19	1.8801	3 56 29.5
18	9 11 4.10	1.9194	13 37 26.9	11.192	18	10 41 44.01	1.8808	3 43 12.5
19	9 12 59.20	1.9173	13 26 13.5	11.253	19	10 43 36.88	1.8816	3 29 53.9
20	9 14 54.18	1.9153	13 14 56.5	11.312	20	10 45 29.80	1.8823	3 16 33.7
21	9 16 49.04	1.9133	13 3 36.0	11.371	21	10 47 22.76	1.8832	3 3 12.0
22	9 18 43.78	1.9114	12 52 12.0	11.429	22	10 49 15.78	1.8842	2 49 48.9
23	9 20 38.41	1.9095	12 40 44.5	11.487	23	10 51 8.86	1.8851	2 36 24.4
24	9 22 32.92	1.9076	N. 12 29 13.6	11.543	24	10 53 1.99	1.8862	N. 2 22 58.5

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 25.					MONDAY 27.				
0	10 53 1.99	1.8862	N. 2 22 58.5	13.443	0	12 26 18.11	2.0308	S. 8 32 27.9	13.512
1	10 54 55.20	1.8874	2 9 31.2	13.465	1	12 28 20.11	2.0358	8 45 58.0	13.489
2	10 56 48.48	1.8887	1 56 2.7	13.485	2	12 30 22.41	2.0409	8 59 26.6	13.464
3	10 58 41.84	1.8900	1 42 33.0	13.506	3	12 32 25.02	2.0461	9 12 53.7	13.439
4	11 0 35.28	1.8914	1 29 2.0	13.526	4	12 34 27.94	2.0513	9 26 19.3	13.412
5	11 2 28.81	1.8929	1 15 29.9	13.544	5	12 36 31.18	2.0567	9 39 43.2	13.384
6	11 4 22.43	1.8944	1 1 56.7	13.562	6	12 38 34.75	2.0622	9 53 5.4	13.355
7	11 6 16.14	1.8960	0 48 22.4	13.579	7	12 40 38.64	2.0677	10 6 25.8	13.325
8	11 8 9.95	1.8977	0 34 47.2	13.595	8	12 42 42.87	2.0732	10 19 44.4	13.293
9	11 10 3.87	1.8995	0 21 11.0	13.611	9	12 44 47.43	2.0789	10 33 1.0	13.261
10	11 11 57.89	1.9013	N. 0 7 33.9	13.626	10	12 46 52.34	2.0847	10 46 15.7	13.227
11	11 13 52.03	1.9032	S. 0 6 4.1	13.640	11	12 48 57.59	2.0905	10 59 28.2	13.190
12	11 15 46.28	1.9052	0 19 42.9	13.652	12	12 51 3.20	2.0964	11 12 38.5	13.153
13	11 17 40.66	1.9073	0 33 22.4	13.665	13	12 53 9.16	2.1023	11 25 46.6	13.116
14	11 19 35.16	1.9094	0 47 2.7	13.677	14	12 55 15.48	2.1084	11 38 52.4	13.076
15	11 21 29.79	1.9117	1 0 43.6	13.687	15	12 57 22.17	2.1146	11 51 55.7	13.035
16	11 23 24.56	1.9140	1 14 25.1	13.696	16	12 59 29.23	2.1208	12 4 56.6	12.993
17	11 25 19.47	1.9163	1 28 7.1	13.705	17	13 1 36.67	2.1272	12 17 54.9	12.949
18	11 27 14.52	1.9188	1 41 49.7	13.714	18	13 3 44.49	2.1335	12 30 50.5	12.904
19	11 29 9.73	1.9214	1 55 32.8	13.721	19	13 5 52.69	2.1399	12 43 43.4	12.857
20	11 31 5.09	1.9240	2 9 16.2	13.727	20	13 8 1.28	2.1465	12 56 33.4	12.809
21	11 33 0.61	1.9267	2 23 0.0	13.732	21	13 10 10.27	2.1531	13 9 20.5	12.761
22	11 34 56.30	1.9296	2 36 44.1	13.737	22	13 12 19.65	2.1597	13 22 4.7	12.710
23	11 36 52.16	1.9324	S. 2 50 28.4	13.740	23	13 14 29.44	2.1665	S. 13 34 45.7	12.658
SUNDAY 26.					TUESDAY 28.				
0	11 38 48.19	1.9353	S. 3 4 12.9	13.743	0	13 16 39.63	2.1733	S. 13 47 23.6	12.604
1	11 40 44.40	1.9383	3 17 57.6	13.745	1	13 18 50.24	2.1802	13 59 58.2	12.548
2	11 42 40.79	1.9415	3 31 42.3	13.745	2	13 21 1.26	2.1872	14 12 29.4	12.492
3	11 44 37.38	1.9447	3 45 27.0	13.745	3	13 23 12.70	2.1942	14 24 57.2	12.434
4	11 46 34.16	1.9480	3 59 11.7	13.745	4	13 25 24.56	2.2012	14 37 21.5	12.374
5	11 48 31.14	1.9513	4 12 56.4	13.743	5	13 27 36.85	2.2084	14 49 42.1	12.312
6	11 50 28.32	1.9547	4 26 40.9	13.740	6	13 29 49.57	2.2157	15 1 58.9	12.248
7	11 52 25.71	1.9582	4 40 25.2	13.736	7	13 32 2.73	2.2229	15 14 11.9	12.184
8	11 54 23.31	1.9618	4 54 9.2	13.731	8	13 34 16.32	2.2302	15 26 21.0	12.118
9	11 56 21.13	1.9656	5 7 52.9	13.725	9	13 36 30.36	2.2377	15 38 26.1	12.051
10	11 58 19.18	1.9694	5 21 36.2	13.718	10	13 38 44.84	2.2452	15 50 27.1	11.981
11	12 0 17.46	1.9732	5 35 19.1	13.710	11	13 40 59.78	2.2527	16 2 23.8	11.909
12	12 2 15.97	1.9772	5 49 1.4	13.701	12	13 43 15.16	2.2602	16 14 16.2	11.837
13	12 4 14.72	1.9812	6 2 43.2	13.692	13	13 45 31.00	2.2678	16 26 4.2	11.762
14	12 6 13.71	1.9852	6 16 24.4	13.681	14	13 47 47.30	2.2755	16 37 47.6	11.685
15	12 8 12.95	1.9894	6 30 4.9	13.669	15	13 50 4.06	2.2833	16 49 26.4	11.607
16	12 10 12.44	1.9937	6 43 44.7	13.656	16	13 52 21.29	2.2911	17 1 0.5	11.528
17	12 12 12.19	1.9981	6 57 23.6	13.642	17	13 54 38.99	2.2989	17 12 29.8	11.447
18	12 14 12.21	2.0025	7 11 1.7	13.627	18	13 56 57.16	2.3068	17 23 54.1	11.363
19	12 16 12.49	2.0070	7 24 38.8	13.610	19	13 59 15.81	2.3147	17 35 13.3	11.278
20	12 18 13.05	2.0116	7 38 14.9	13.592	20	14 1 34.93	2.3227	17 46 27.4	11.192
21	12 20 13.88	2.0163	7 51 49.9	13.574	21	14 3 54.53	2.3307	17 57 36.3	11.103
22	12 22 15.00	2.0211	8 5 23.8	13.555	22	14 6 14.61	2.3387	18 8 39.8	11.012
23	12 24 16.41	2.0259	8 18 56.5	13.534	23	14 8 35.17	2.3467	18 19 37.8	10.921
24	12 26 18.11	2.0308	S. 8 32 27.9	13.512	24	14 10 56.21	2.3547	S. 18 30 30.3	10.828

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
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WEDNESDAY 29.

	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	14 10 56.21	2.3547	S. 18 30 30.3	10.828
1	14 13 17.74	2.3629	18 41 17.1	10.731
2	14 15 39.76	2.3711	18 51 58.0	10.633
3	14 18 2.27	2.3793	19 2 33.1	10.535
4	14 20 25.27	2.3875	19 13 2.2	10.433
5	14 22 48.77	2.3957	19 23 25.1	10.330
6	14 25 12.76	2.4039	19 33 41.8	10.225
7	14 27 37.24	2.4122	19 43 52.1	10.117
8	14 30 2.22	2.4204	19 53 55.9	10.009
9	14 32 27.69	2.4287	20 3 53.2	9.898
10	14 34 53.66	2.4369	20 13 43.7	9.785
11	14 37 20.12	2.4452	20 23 27.4	9.671
12	14 39 47.08	2.4535	20 33 4.2	9.555
13	14 42 14.54	2.4617	20 42 34.0	9.437
14	14 44 42.49	2.4700	20 51 56.6	9.317
15	14 47 10.94	2.4782	21 1 12.0	9.195
16	14 49 39.88	2.4864	21 10 20.0	9.071
17	14 52 9.31	2.4946	21 19 20.5	8.944
18	14 54 39.23	2.5027	21 28 13.3	8.817
19	14 57 9.64	2.5109	21 36 58.5	8.687
20	14 59 40.54	2.5190	21 45 35.8	8.556
21	15 2 11.92	2.5271	21 54 5.2	8.423
22	15 4 43.79	2.5352	22 2 26.5	8.287
23	15 7 16.14	2.5432	S. 22 10 39.6	8.149

THURSDAY 30.

	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	15 9 48.97	2.5511	S. 22 18 44.4	8.010
1	15 12 22.27	2.5590	22 26 40.8	7.869
2	15 14 56.05	2.5669	22 34 28.7	7.727
3	15 17 30.30	2.5747	22 42 8.0	7.584
4	15 20 5.01	2.5823	22 49 38.5	7.434
5	15 22 40.18	2.5900	22 57 0.1	7.286
6	15 25 15.81	2.5976	23 4 12.8	7.136
7	15 27 51.89	2.6051	23 11 16.4	6.984
8	15 30 28.42	2.6126	23 18 10.9	6.831
9	15 33 5.40	2.6199	23 24 56.1	6.675
10	15 35 42.81	2.6271	23 31 31.9	6.517
11	15 38 20.65	2.6342	23 37 58.2	6.358
12	15 40 58.91	2.6412	23 44 14.9	6.197
13	15 43 37.60	2.6483	23 50 21.9	6.035
14	15 46 16.71	2.6552	23 56 19.1	5.871
15	15 48 56.22	2.6618	24 2 6.4	5.706
16	15 51 36.13	2.6685	24 7 43.8	5.538
17	15 54 16.44	2.6751	24 13 11.0	5.368
18	15 56 57.14	2.6815	24 18 28.0	5.198
19	15 59 38.22	2.6877	24 23 34.7	5.026
20	16 2 19.67	2.6939	24 28 31.1	4.852
21	16 5 1.49	2.6999	24 33 17.0	4.677
22	16 7 43.66	2.7057	24 37 52.4	4.501
23	16 10 26.18	2.7116	24 42 17.1	4.323
24	16 13 9.05	2.7172	S. 24 46 31.1	4.143

FRIDAY, JULY 1, 1898.

	<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>
0	16 13 9.05	2.7172	S. 24 46 31.1	4.143

PHASES OF THE MOON.

	<sup>d</sup> <sup>h</sup> <sup>m</sup>
○ Full Moon . . . . .	June 4 2 11.3
☾ Last Quarter . . . . .	10 18 4.1
● New Moon . . . . .	18 16 19.3
☽ First Quarter . . . . .	26 16 54.0

	<sup>d</sup> <sup>h</sup>
☾ Perigee . . . . .	June 4 16.4
☾ Apogee . . . . .	19 2.0

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
1	Regulus	W.	59 49 18	2273	61 35 57	2255	63 23 3	2238	65 10 34	2220
	JUPITER	W.	28 24 35	2379	30 8 40	2350	31 53 26	2324	33 38 51	2300
	Antares	E.	40 8 54	2263	38 22 0	2245	36 34 40	2229	34 46 55	2212
	SATURN	E.	41 20 10	2281	39 33 42	2267	37 46 54	2253	35 59 46	2242
	α Aquilæ	E.	94 29 35	2807	92 55 16	2788	91 20 33	2770	89 45 26	2754
2	Regulus	W.	74 14 19	2143	76 4 13	2128	77 54 29	2115	79 45 6	2102
	JUPITER	W.	42 34 21	2195	44 22 56	2177	46 11 58	2162	48 1 25	2145
	α Aquilæ	E.	81 45 2	2692	80 8 12	2684	78 31 11	2679	76 54 3	2675
	Fomalhaut	E.	106 38 9	2586	104 58 55	2564	103 19 11	2544	101 38 59	2525
3	Regulus	W.	89 2 48	2046	90 55 10	2037	92 47 47	2029	94 40 36	2021
	JUPITER	W.	57 14 8	2080	59 5 38	2070	60 57 24	2060	62 49 25	2051
	Spica	W.	35 0 12	2055	36 52 20	2044	38 44 45	2035	40 37 25	2026
	α Aquilæ	E.	68 47 49	2684	67 10 47	2693	65 33 58	2704	63 57 24	2719
	Fomalhaut	E.	93 12 10	2454	91 29 52	2445	89 47 21	2436	88 4 37	2429
4	JUPITER	W.	72 12 29	2019	74 5 33	2016	75 58 42	2014	77 51 55	2011
	Spica	W.	50 3 46	1994	51 57 29	1991	53 51 18	1988	55 45 11	1986
	α Aquilæ	E.	56 0 58	2647	54 27 31	2687	52 54 55	2691	51 23 15	2681
	Fomalhaut	E.	79 29 20	2419	77 46 13	2422	76 3 10	2428	74 20 15	2434
	α Pegasi	E.	99 59 45	2132	98 9 35	2128	96 19 18	2124	94 28 56	2122
5	JUPITER	W.	87 18 22	2014	89 11 34	2017	91 4 41	2021	92 57 42	2026
	Spica	W.	65 15 3	1987	67 8 57	1990	69 2 47	1994	70 56 31	1998
	Fomalhaut	E.	65 49 0	2499	64 7 46	2520	62 27 0	2543	60 46 46	2568
	α Pegasi	E.	85 16 41	2126	83 26 21	2130	81 36 7	2135	79 46 1	2141
6	Spica	W.	80 23 8	2030	82 15 55	2039	84 8 28	2048	86 0 47	2050
	Antares	W.	34 40 26	2026	36 33 19	2035	38 25 58	2044	40 18 23	2054
	SATURN	W.	34 26 13	2057	36 18 19	2061	38 10 19	2066	40 2 11	2073
	Fomalhaut	E.	52 35 49	2747	51 0 12	2796	49 25 39	2849	47 52 15	2909
	α Pegasi	E.	70 38 28	2189	68 49 44	2202	67 1 19	2216	65 13 15	2231
	MARS	E.	106 29 31	2672	104 42 51	2281	102 56 24	2290	101 10 10	2300
7	Antares	W.	49 36 27	2111	51 27 9	2124	53 17 31	2137	55 7 33	2151
	SATURN	W.	49 18 27	2119	51 8 57	2130	52 59 10	2142	54 49 5	2155
	α Pegasi	E.	56 19 8	2326	54 33 46	2349	52 48 58	2374	51 4 46	2401
	MARS	E.	92 23 0	2360	90 38 28	2373	88 54 15	2388	87 10 23	2402
	α Arietis	E.	98 14 56	2126	96 24 36	2139	94 34 37	2153	92 44 58	2167
8	Antares	W.	64 12 19	2226	66 0 8	2241	67 47 34	2258	69 34 36	2274
	SATURN	W.	63 53 39	2225	65 41 29	2240	67 28 57	2256	69 16 2	2271
	MARS	E.	78 36 26	2482	76 54 48	2499	75 13 33	2516	73 32 42	2535
	α Arietis	E.	83 42 7	2241	81 54 41	2258	80 7 39	2274	78 21 1	2290
	SUN	E.	125 22 11	2530	123 41 40	2547	122 1 32	2564	120 21 47	2581
9	Antares	W.	78 23 41	2357	80 8 17	2374	81 52 29	2391	83 36 16	2408
	SATURN	W.	78 5 35	2353	79 50 18	2370	81 34 36	2386	83 18 31	2403
	MARS	E.	65 14 40	2625	63 36 19	2643	61 58 23	2663	60 20 53	2681
	α Arietis	E.	69 33 58	2375	67 49 48	2393	66 6 3	2410	64 22 43	2428
	SUN	E.	112 9 1	2669	110 31 40	2687	108 54 43	2705	107 18 10	2723



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	Regulus W.	66 58 31	2204	68 46 52	2188	70 35 38	2172	72 24 47	2157
	JUPITER W.	35 24 52	2276	37 11 27	2253	38 58 35	2233	40 46 13	2213
	Antares E.	32 58 46	2195	31 10 13	2181	29 21 17	2167	27 31 59	2152
	SATURN E.	34 12 21	2231	32 24 40	2221	30 36 44	2214	28 48 37	2209
	α Aquilæ E.	88 9 58	2739	86 34 10	2725	84 58 3	2713	83 21 40	2701
2	Regulus W.	81 36 2	2089	83 27 18	2078	85 18 51	2067	87 10 41	2056
	JUPITER W.	49 51 15	2130	51 41 28	2116	53 32 2	2105	55 22 56	2092
	α Aquilæ E.	75 16 49	2672	73 39 32	2672	72 2 14	2674	70 24 59	2678
	Fomalhaut E.	99 58 21	2509	98 17 20	2492	96 35 56	2478	94 54 12	2465
3	Regulus W.	96 33 38	2014	98 26 51	2008	100 20 13	2002	102 13 44	1998
	JUPITER W.	64 41 40	2043	66 34 7	2036	68 26 45	2030	70 19 33	2025
	Spica W.	42 30 19	2018	44 23 25	2010	46 16 43	2005	48 10 10	1999
	α Aquilæ E.	62 21 10	2738	60 45 20	2739	59 9 58	2784	57 35 9	2813
	Fomalhaut E.	86 21 44	2424	84 38 44	2420	82 55 38	2418	81 12 29	2418
4	JUPITER W.	79 45 12	2010	81 38 30	2010	83 31 49	2010	85 25 7	2012
	Spica W.	57 39 8	1984	59 33 7	1984	61 27 7	1984	63 21 6	1986
	α Aquilæ E.	49 52 39	2039	48 23 15	2104	46 55 10	2178	45 28 34	2263
	Fomalhaut E.	72 37 29	2443	70 54 56	2454	69 12 38	2467	67 30 38	2482
	α Pegasi E.	92 38 30	2120	90 48 2	2120	88 57 33	2121	87 7 6	2122
5	JUPITER W.	94 50 36	2032	96 43 21	2037	98 35 57	2044	100 28 22	2053
	Spica W.	72 50 9	2003	74 43 39	2009	76 36 59	2016	78 30 9	2023
	Fomalhaut E.	59 7 7	2597	57 28 8	2629	55 49 52	2664	54 12 24	2704
	α Pegasi E.	77 56 5	2149	76 6 20	2157	74 16 48	2167	72 27 30	2177
6	Spica W.	87 52 50	2069	89 44 37	2079	91 36 8	2091	93 27 21	2103
	Antares W.	42 10 33	2064	44 2 27	2075	45 54 5	2086	47 45 25	2098
	SATURN W.	41 53 52	2080	43 45 22	2089	45 36 38	2098	47 27 40	2108
	Fomalhaut E.	46 20 7	2074	44 49 22	2048	43 20 9	2129	41 52 35	2221
	α Pegasi E.	63 25 33	2247	61 38 16	2265	59 51 25	2284	58 5 2	2304
	MARS E.	99 24 11	2311	97 38 28	2322	95 53 1	2334	94 7 51	2347
7	Antares W.	56 57 14	2166	58 46 33	2180	60 35 31	2195	62 24 6	2210
	SATURN W.	56 38 41	2168	58 27 57	2182	60 16 52	2196	62 5 26	2210
	α Pegasi E.	49 21 12	2429	47 38 18	2460	45 56 8	2492	44 14 43	2527
	MARS E.	85 26 51	2417	83 43 41	2433	82 0 53	2449	80 18 28	2465
	α Arietis E.	90 55 40	2181	89 6 44	2195	87 18 9	2210	85 29 57	2225
8	Antares W.	71 21 13	2290	73 7 27	2307	74 53 16	2324	76 38 41	2341
	SATURN W.	71 2 44	2287	72 49 2	2303	74 34 57	2320	76 20 28	2336
	MARS E.	71 52 16	2552	70 12 15	2559	68 32 38	2588	66 53 26	2607
	α Arietis E.	76 34 47	2307	74 48 58	2324	73 3 33	2341	71 18 33	2358
	SUN E.	118 42 26	2598	117 3 28	2616	115 24 55	2634	113 46 46	2652
9	Antares W.	85 19 39	2426	87 2 37	2442	88 45 12	2459	90 27 23	2476
	SATURN W.	85 2 1	2419	86 45 8	2437	88 27 50	2454	90 10 8	2470
	MARS E.	58 43 48	2700	57 7 8	2719	55 30 54	2738	53 55 5	2758
	α Arietis E.	62 39 48	2445	60 57 18	2463	59 15 13	2481	57 33 33	2499
	SUN E.	105 42 1	2742	104 6 17	2760	102 30 56	2778	100 55 59	2795

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
10	Antares	W.	92 9 10	2492	93 50 34	2510	95 31 34	2526	97 12 11	2542
	SATURN	W.	91 52 3	2487	93 33 34	2504	95 14 42	2520	96 55 27	2536
	α Aquilæ	W.	45 19 2	2707	46 35 42	2656	47 53 16	2613	49 11 36	2576
	MARS	E.	52 19 42	2777	50 44 44	2796	49 10 11	2816	47 36 4	2835
	α Arietis	E.	55 52 18	2517	54 11 28	2534	52 31 2	2551	50 51 0	2569
	SUN	E.	99 21 25	2814	97 47 15	2831	96 13 28	2849	94 40 4	2866
11	Antares	W.	105 29 43	2621	107 8 9	2637	108 46 14	2652	110 23 59	2667
	SATURN	W.	105 13 37	2616	106 52 10	2632	108 30 21	2648	110 8 11	2663
	α Aquilæ	W.	55 51 56	2451	57 13 15	2437	58 34 50	2424	59 56 39	2414
	MARS	E.	39 51 47	2935	38 20 12	2954	36 49 2	2976	35 18 19	2997
	α Arietis	E.	42 36 56	2658	40 59 20	2675	39 22 7	2693	37 45 18	2711
	SUN	E.	86 58 35	2952	85 27 22	2968	83 56 29	2984	82 25 56	3000
12	α Aquilæ	W.	66 48 0	3387	68 10 31	3386	69 33 3	3386	70 55 35	3386
	Fomalhaut	W.	42 32 42	3753	43 48 33	3708	45 5 12	3669	46 22 32	3635
	SUN	E.	74 58 2	3075	73 29 22	3090	72 1 0	3104	70 32 55	3118
13	α Aquilæ	W.	77 47 47	3402	79 10 1	3407	80 32 10	3413	81 54 12	3418
	Fomalhaut	W.	52 57 6	3517	54 17 11	3501	55 37 34	3488	56 58 11	3476
	α Pegasi	W.	30 2 37	3446	31 24 1	3406	32 46 11	3371	34 9 1	3341
	SUN	E.	63 16 31	3181	61 49 59	3193	60 23 41	3204	58 57 37	3215
14	α Aquilæ	W.	88 42 33	3455	90 3 47	3463	91 24 52	3472	92 45 47	3481
	Fomalhaut	W.	63 44 2	3438	65 5 35	3434	66 27 13	3431	67 48 55	3427
	α Pegasi	W.	41 10 8	3250	42 35 18	3239	44 0 41	3231	45 26 14	3223
	SUN	E.	51 50 28	3266	50 25 37	3276	49 0 58	3285	47 36 29	3294
15	α Aquilæ	W.	99 27 37	3535	100 47 23	3547	102 6 55	3560	103 26 13	3573
	Fomalhaut	W.	74 37 59	3423	75 59 50	3423	77 21 40	3424	78 43 29	3426
	α Pegasi	W.	52 35 46	3201	54 1 54	3198	55 28 5	3197	56 54 18	3196
	SUN	E.	40 36 33	3334	39 13 1	3341	37 49 37	3349	36 26 22	3355
16	Fomalhaut	W.	85 32 3	3438	86 53 37	3441	88 15 7	3445	89 36 33	3449
	α Pegasi	W.	64 5 35	3194	65 31 51	3194	66 58 7	3195	68 24 22	3196
	SUN	E.	29 31 55	3386	28 9 22	3392	26 46 56	3397	25 24 36	3403
20	SUN	W.	14 18 8	3463	15 39 13	3457	17 0 25	3452	18 21 43	3446
	Regulus	E.	45 0 4	3089	43 31 41	3089	42 3 18	3089	40 34 55	3088
	JUPITER	E.	77 45 42	3123	76 18 0	3122	74 50 17	3121	73 22 33	3119
	Spica	E.	99 1 20	3075	97 32 40	3074	96 3 59	3073	94 35 16	3071
21	SUN	W.	25 9 32	3425	26 31 20	3421	27 53 13	3416	29 15 11	3412
	Regulus	E.	33 12 52	3087	31 44 27	3087	30 16 2	3088	28 47 38	3088
	JUPITER	E.	66 3 25	3111	64 35 29	3110	63 7 31	3107	61 39 30	3105
	Spica	E.	87 11 3	3059	85 42 3	3056	84 12 59	3053	82 43 52	3049
22	SUN	W.	36 6 23	3386	37 28 56	3380	38 51 35	3374	40 14 21	3368
	Pollux	W.	17 26 0	3388	18 48 30	3330	20 12 7	3282	21 36 39	3243
	JUPITER	E.	54 18 38	3091	52 50 17	3087	51 21 52	3084	49 53 23	3080
	Spica	E.	75 17 5	3029	73 47 28	3024	72 17 45	3018	70 47 55	3014
	SATURN	E.	120 17 22	3022	118 47 37	3017	117 17 45	3011	115 47 46	3005

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
10	Antares	W.	98 52 26	2559	100 32 18	2574	102 11 48	2591	103 50 56	2606
	SATURN	W.	98 35 50	2583	100 15 50	2569	101 55 27	2585	103 34 43	2601
	α Aquilæ	W.	50 30 37	3543	51 50 14	3515	53 10 22	3490	54 30 57	3469
	MARS	E.	46 2 22	2855	44 29 5	2875	42 56 14	2894	41 23 48	2914
	α Arietis	E.	49 11 23	2587	47 32 10	2604	45 53 21	2622	44 14 56	2640
	SUN	E.	93 7 2	2883	91 34 22	2901	90 2 5	2918	88 30 9	2935
11	Antares	W.	112 1 23	2681	113 38 28	2695	115 15 14	2710	116 51 41	2723
	SATURN	W.	111 45 41	2678	113 22 51	2692	114 59 41	2707	116 36 12	2722
	α Aquilæ	W.	61 18 40	3406	62 40 50	3399	64 3 8	3393	65 25 32	3390
	MARS	E.	33 48 2	3018	32 18 12	3041	30 48 50	3064	29 19 56	3087
	α Arietis	E.	36 8 53	2729	34 32 52	2748	32 57 16	2767	31 22 5	2787
	SUN	E.	80 55 43	3015	79 25 49	3031	77 56 15	3046	76 26 59	3061
12	α Aquilæ	W.	72 18 7	3388	73 40 37	3391	75 3 4	3393	76 25 28	3398
	Fomalhaut	W.	47 40 29	3604	48 58 59	3578	50 17 57	3555	51 37 20	3535
	SUN	E.	69 5 7	3131	67 37 35	3143	66 10 18	3157	64 43 17	3169
13	α Aquilæ	W.	83 16 8	3425	84 37 56	3431	85 59 37	3439	87 21 9	3446
	Fomalhaut	W.	58 19 2	3466	59 40 4	3458	61 1 15	3450	62 22 35	3444
	α Pegasi	W.	35 32 25	3316	36 56 18	3295	38 20 35	3277	39 45 13	3263
	SUN	E.	57 31 46	3226	56 6 8	3237	54 40 43	3247	53 15 30	3257
14	α Aquilæ	W.	94 6 32	3491	95 27 6	3502	96 47 28	3512	98 7 39	3524
	Fomalhaut	W.	69 10 41	3425	70 32 29	3424	71 54 18	3423	73 16 8	3423
	α Pegasi	W.	46 51 56	3217	48 17 45	3211	49 43 41	3208	51 9 41	3204
	SUN	E.	46 12 11	3302	44 48 2	3311	43 24 3	3319	42 0 14	3326
15	α Aquilæ	W.	104 45 17	3527	106 4 6	3601	107 22 39	3616	108 40 56	3631
	Fomalhaut	W.	80 5 16	3427	81 27 2	3430	82 48 45	3431	84 10 26	3435
	α Pegasi	W.	58 20 32	3195	59 46 47	3194	61 13 3	3194	62 39 19	3194
	SUN	E.	35 3 14	3362	33 40 14	3368	32 17 21	3374	30 54 35	3379
16	Fomalhaut	W.	90 57 54	3453	92 19 11	3458	93 40 22	3463	95 1 28	3468
	α Pegasi	W.	69 50 36	3197	71 16 49	3197	72 43 2	3198	74 9 14	3199
	SUN	E.	24 2 23	3408	22 40 16	3415	21 18 16	3420	19 56 22	3425
20	SUN	W.	19 43 7	3442	21 4 36	3438	22 26 10	3433	23 47 49	3430
	Regulus	E.	39 6 31	3088	37 38 7	3087	36 9 42	3087	34 41 17	3087
	JUPITER	E.	71 54 47	3118	70 26 59	3117	68 59 10	3115	67 31 19	3113
	Spica	E.	93 6 31	3069	91 37 43	3067	90 8 53	3065	88 40 0	3061
21	SUN	W.	30 37 14	3407	31 59 23	3402	33 21 37	3397	34 43 57	3392
	Regulus	E.	27 19 14	3089	25 50 51	3091	24 22 31	3094	22 54 14	3098
	JUPITER	E.	60 11 26	3102	58 43 19	3100	57 15 9	3096	55 46 55	3094
	Spica	E.	81 14 40	3046	79 45 24	3042	78 16 3	3038	76 46 37	3033
22	SUN	W.	41 37 14	3361	43 0 15	3355	44 23 23	3347	45 46 40	3340
	Pollux	W.	23 1 57	3210	24 27 54	3181	25 54 26	3156	27 21 28	3133
	JUPITER	E.	48 24 49	3077	46 56 11	3073	45 27 29	3070	43 58 43	3067
	Spica	E.	69 17 59	3008	67 47 56	3001	66 17 45	2996	64 47 27	2989
	SATURN	E.	114 17 39	2999	112 47 25	2992	111 17 2	2985	109 46 31	2979

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
23	SUN W.	47 10 5	3332	48 33 39	3324	49 57 23	3316	51 21 16	3307
	Pollux W.	28 48 58	3112	30 16 53	3092	31 45 12	3074	33 13 53	3058
	VENUS W.	15 48 7	3505	17 8 26	3486	18 29 6	3469	19 50 5	3452
	JUPITER E.	42 29 53	3064	41 0 59	3060	39 32 0	3056	38 2 57	3054
	Spica E.	63 17 1	2982	61 46 26	2976	60 15 43	2968	58 44 50	2961
	SATURN E.	108 15 52	2971	106 45 3	2964	105 14 5	2956	103 42 57	2948
	Antares E.	108 56 51	2975	107 26 7	2967	105 55 13	2960	104 24 10	2952
24	SUN W.	58 23 21	3259	59 48 21	3248	61 13 33	3236	62 38 59	3225
	Pollux W.	40 42 11	2982	42 12 46	2969	43 43 38	2954	45 14 48	2940
	VENUS W.	26 39 20	3380	28 1 59	3368	29 24 53	3354	30 48 2	3340
	Spica E.	51 7 57	2919	49 36 2	2909	48 3 55	2900	46 31 36	2890
	SATURN E.	96 4 38	2904	94 32 24	2894	92 59 57	2883	91 27 17	2873
	Antares E.	96 46 18	2908	95 14 9	2898	93 41 48	2883	92 9 14	2877
25	SUN W.	69 49 38	3163	71 16 31	3149	72 43 41	3136	74 11 7	3122
	Pollux W.	52 55 4	2870	54 28 1	2855	56 1 17	2842	57 34 51	2827
	VENUS W.	37 47 47	3270	39 12 34	3255	40 37 38	3241	42 2 59	3225
	Spica E.	38 46 46	2838	37 13 7	2826	35 39 13	2815	34 5 5	2805
	SATURN E.	83 40 31	2817	82 6 25	2805	80 32 4	2792	78 57 26	2780
	Antares E.	84 22 53	2821	82 48 52	2808	81 14 35	2795	79 40 1	2782
26	SUN W.	81 32 43	3046	83 1 59	3030	84 31 34	3014	86 1 30	2997
	VENUS W.	49 14 21	3146	50 41 35	3129	52 9 10	3112	53 37 5	3095
	Regulus W.	28 25 18	2754	30 0 46	2735	31 36 39	2717	33 12 56	2699
	SATURN E.	71 0 0	2712	69 23 36	2698	67 46 53	2684	66 9 51	2669
	Antares E.	71 42 47	2713	70 6 24	2698	68 29 41	2683	66 52 38	2668
27	SUN W.	93 36 28	2910	95 8 34	2892	96 41 3	2874	98 13 55	2855
	VENUS W.	61 2 3	3005	62 32 9	2986	64 2 39	2967	65 33 33	2949
	Regulus W.	41 20 27	2608	42 59 11	2591	44 38 19	2572	46 17 52	2554
	SATURN E.	57 59 38	2593	56 20 33	2577	54 41 7	2561	53 1 19	2546
	Antares E.	58 42 7	2587	57 2 54	2571	55 23 19	2553	53 43 20	2537
28	SUN W.	106 4 17	2761	107 39 36	2743	109 15 19	2724	110 51 27	2704
	VENUS W.	73 14 1	2853	74 47 20	2833	76 21 5	2814	77 55 15	2795
	Regulus W.	54 41 55	2463	56 24 0	2445	58 6 31	2426	59 49 28	2408
	SATURN E.	44 36 56	2468	42 54 58	2454	41 12 40	2439	39 30 1	2425
	Antares E.	45 17 29	2450	43 35 5	2433	41 52 17	2415	40 9 4	2398
	α Aquilæ E.	99 4 22	3003	97 34 13	2981	96 3 37	2960	94 32 34	2939
29	VENUS W.	85 52 24	2698	87 29 6	2680	89 6 13	2661	90 43 45	2643
	Regulus W.	68 30 42	2319	70 16 14	2301	72 2 12	2284	73 48 35	2266
	JUPITER W.	35 25 15	2415	37 8 29	2391	38 52 17	2368	40 36 37	2346
	α Aquilæ E.	86 51 14	2852	85 17 53	2838	83 44 14	2824	82 10 17	2811
30	VENUS W.	98 57 29	2556	100 37 25	2540	102 17 43	2524	103 58 23	2508
	Regulus W.	82 46 43	2186	84 35 32	2170	86 24 45	2155	88 14 20	2141
	JUPITER W.	49 25 48	2250	51 13 1	2232	53 0 41	2215	54 48 46	2199
	Spica W.	28 45 30	2203	30 33 53	2186	32 22 42	2169	34 11 57	2151
	α Aquilæ E.	74 17 9	2772	72 42 4	2768	71 6 54	2766	69 31 42	2768
	Fomalhaut E.	98 53 8	2604	97 14 18	2586	95 35 4	2569	93 55 26	2552

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
23	SUN W.	52 45 19	3299	54 9 32	3288	55 33 57	3279	56 58 33	3269
	Pollux W.	34 42 54	3042	36 12 15	3026	37 41 55	3011	39 11 54	2997
	VENUS W.	21 11 23	3437	22 32 58	3423	23 54 49	3408	25 16 57	3394
	JUPITER E.	36 33 51	3052	35 4 42	3049	33 35 30	3047	32 6 16	3047
	Spica E.	57 13 48	2953	55 42 36	2945	54 11 14	2936	52 39 41	2927
	SATURN E.	102 11 39	2939	100 40 10	2931	99 8 31	2922	97 36 40	2913
	Antares E.	102 52 57	2944	101 21 34	2935	99 50 0	2927	98 18 15	2917
24	SUN W.	64 4 38	3214	65 30 31	3202	66 56 38	3189	68 23 0	3176
	Pollux W.	46 46 16	2927	48 18 1	2912	49 50 4	2898	51 22 25	2884
	VENUS W.	32 11 27	3327	33 35 7	3313	34 59 4	3299	36 23 17	3284
	Spica E.	44 59 4	2880	43 26 20	2869	41 53 22	2859	40 20 11	2848
	SATURN E.	89 54 24	2863	88 21 18	2852	86 47 57	2840	85 14 21	2829
	Antares E.	90 36 26	2867	89 3 25	2855	87 30 9	2845	85 56 39	2832
25	SUN W.	75 38 50	3108	77 6 50	3092	78 35 9	3077	80 3 47	3062
	Pollux W.	59 8 44	2812	60 42 56	2797	62 17 28	2782	63 52 20	2766
	VENUS W.	43 28 38	3210	44 54 35	3194	46 20 51	3178	47 47 26	3162
	Spica E.	32 30 43	2793	30 56 6	2782	29 21 15	2771	27 46 9	2760
	SATURN E.	77 22 32	2767	75 47 21	2753	74 11 52	2740	72 36 5	2726
	Antares E.	78 5 10	2769	76 30 1	2756	74 54 35	2741	73 18 50	2728
26	SUN W.	87 31 47	2980	89 2 25	2963	90 33 24	2946	92 4 45	2928
	VENUS W.	55 5 21	3077	56 33 59	3060	58 2 58	3042	59 32 19	3023
	Regulus W.	34 49 37	2681	36 26 43	2665	38 4 13	2644	39 42 8	2626
	SATURN E.	64 32 29	2654	62 54 47	2639	61 16 45	2624	59 38 22	2608
	Antares E.	65 15 15	2652	63 37 31	2636	61 59 25	2620	60 20 57	2604
27	SUN W.	99 47 11	2837	101 20 51	2818	102 54 55	2799	104 29 24	2781
	VENUS W.	67 4 50	2990	68 36 31	2970	70 8 37	2951	71 41 7	2933
	Regulus W.	47 57 50	2536	49 38 13	2517	51 19 2	2499	53 0 16	2482
	SATURN E.	51 21 10	2530	49 40 39	2515	47 59 46	2499	46 18 32	2484
	Antares E.	52 2 58	2520	50 22 12	2502	48 41 2	2485	46 59 28	2467
28	SUN W.	112 28 1	2686	114 5 0	2666	115 42 25	2648	117 20 15	2629
	VENUS W.	79 29 50	2775	81 4 50	2756	82 40 16	2737	84 16 7	2717
	Regulus W.	61 32 51	2390	63 16 40	2372	65 0 55	2354	66 45 36	2337
	SATURN E.	37 47 2	2412	36 3 44	2398	34 20 7	2386	32 36 12	2375
	Antares E.	38 25 26	2380	36 41 23	2362	34 56 54	2345	33 12 0	2328
	α Aquilæ E.	93 1 5	2920	91 29 11	2901	89 56 54	2884	88 24 15	2867
29	VENUS W.	92 21 41	2625	94 0 2	2607	95 38 47	2590	97 17 56	2572
	Regulus W.	75 35 24	2250	77 22 37	2233	79 10 15	2217	80 58 17	2201
	JUPITER W.	42 21 29	2326	44 6 51	2306	45 52 42	2287	47 39 1	2268
	α Aquilæ E.	80 36 4	2801	79 1 37	2792	77 26 58	2783	75 52 8	2776
30	VENUS W.	105 39 25	2494	107 20 47	2479	109 2 30	2465	110 44 32	2452
	Regulus W.	90 4 17	2127	91 54 35	2113	93 45 14	2100	95 36 13	2088
	JUPITER W.	56 37 15	2183	58 26 8	2169	60 15 23	2154	62 5 0	2141
	Spica W.	36 1 38	2136	37 51 43	2121	39 42 10	2107	41 32 59	2093
	α Aquilæ E.	67 56 32	2771	66 21 26	2755	64 46 26	2738	63 11 36	2725
	Fomalhaut E.	92 15 25	2538	90 35 4	2523	88 54 23	2511	87 13 25	2499

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Added to Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	s	° ' "	"	' "	s	m s	s
Frid.	1	6 41 50.41	10.335	N.23 6 15.9	-10.32	15 46.19	68.77	3 35.32	0.478
Sat.	2	6 45 58.33	10.324	23 1 56.0	11.33	15 46.19	68.73	3 46.65	0.467
SUN.	3	6 50 5.96	10.312	22 57 12.0	12.33	15 46.19	68.69	3 57.69	0.455
Mon.	4	6 54 13.30	10.299	22 52 4.0	-13.33	15 46.20	68.65	4 8.43	0.442
Tues.	5	6 58 20.31	10.285	22 46 32.1	14.32	15 46.21	68.60	4 18.86	0.428
Wed.	6	7 2 26.99	10.271	22 40 36.5	15.31	15 46.22	68.55	4 28.95	0.414
Thur.	7	7 6 33.31	10.256	22 34 17.3	-16.29	15 46.23	68.50	4 38.69	0.399
Frid.	8	7 10 39.28	10.240	22 27 34.6	17.27	15 46.25	68.45	4 48.08	0.383
Sat.	9	7 14 44.86	10.224	22 20 28.6	18.24	15 46.27	68.39	4 57.07	0.367
SUN.	10	7 18 50.04	10.208	22 12 59.4	-19.20	15 46.29	68.33	5 5.68	0.350
Mon.	11	7 22 54.82	10.190	22 5 7.1	20.15	15 46.32	68.27	5 13.87	0.333
Tues.	12	7 26 59.17	10.172	21 56 52.1	21.10	15 46.35	68.21	5 21.65	0.315
Wed.	13	7 31 3.07	10.153	21 48 14.3	-22.04	15 46.39	68.14	5 28.97	0.296
Thur.	14	7 35 6.51	10.134	21 39 14.2	22.97	15 46.43	68.07	5 35.84	0.276
Frid.	15	7 39 9.48	10.114	21 29 51.8	23.89	15 46.48	68.00	5 42.22	0.256
Sat.	16	7 43 11.96	10.093	21 20 7.4	-24.81	15 46.54	67.93	5 48.12	0.235
SUN.	17	7 47 13.93	10.071	21 10 1.1	25.71	15 46.60	67.86	5 53.53	0.214
Mon.	18	7 51 15.37	10.049	20 59 33.4	26.60	15 46.66	67.79	5 58.40	0.192
Tues.	19	7 55 16.28	10.026	20 48 44.3	-27.48	15 46.73	67.71	6 2.74	0.169
Wed.	20	7 59 16.63	10.003	20 37 34.1	28.36	15 46.81	67.63	6 6.52	0.146
Thur.	21	8 3 16.42	9.979	20 26 3.2	29.22	15 46.89	67.55	6 9.74	0.122
Frid.	22	8 7 15.63	9.955	20 14 11.8	-30.07	15 46.98	67.47	6 12.39	0.098
Sat.	23	8 11 14.25	9.930	20 2 0.0	30.91	15 47.07	67.39	6 14.45	0.074
SUN.	24	8 15 12.27	9.905	19 49 28.3	31.73	15 47.17	67.31	6 15.92	0.049
Mon.	25	8 19 9.69	9.880	19 36 36.8	-32.54	15 47.27	67.23	6 16.77	0.023
Tues.	26	8 23 6.50	9.854	19 23 26.0	33.35	15 47.38	67.14	6 17.01	0.002
Wed.	27	8 27 2.69	9.829	19 9 55.9	34.15	15 47.49	67.05	6 16.66	0.028
Thur.	28	8 30 58.26	9.803	18 56 6.9	-34.93	15 47.60	66.97	6 15.67	0.054
Frid.	29	8 34 53.22	9.777	18 41 59.3	35.70	15 47.72	66.88	6 14.07	0.079
Sat.	30	8 38 47.56	9.751	18 27 33.2	36.46	15 47.84	66.79	6 11.87	0.105
SUN.	31	8 42 41.27	9.725	18 12 49.1	37.21	15 47.96	66.70	6 9.04	0.131
Mon.	32	8 46 34.38	9.700	N.17 57 47.2	-37.95	15 48.09	66.61	6 5.59	0.156

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Subtracted from Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
Frid.	1	<sup>h</sup> 6 <sup>m</sup> 41 <sup>s</sup> 49.80	10.334	N. 23 6 16.5	-10.32	<sup>m</sup> 3 <sup>s</sup> 35.29	0.478	<sup>h</sup> 6 <sup>m</sup> 38 <sup>s</sup> 14.51
Sat.	2	6 45 57.68	10.323	23 1 56.7	11.33	3 46.62	0.467	6 42 11.06
SUN.	3	6 50 5.28	10.311	22 57 12.8	12.33	3 57.66	0.455	6 46 7.62
Mon.	4	6 54 12.58	10.298	22 52 4.9	-13.33	4 8.40	0.442	6 50 4.18
Tues.	5	6 58 19.57	10.284	22 46 33.1	14.32	4 18.83	0.428	6 54 0.74
Wed.	6	7 2 26.22	10.270	22 40 37.6	15.30	4 28.92	0.414	6 57 57.30
Thur.	7	7 6 32.52	10.255	22 34 18.6	-16.28	4 38.66	0.399	7 1 53.86
Frid.	8	7 10 38.46	10.239	22 27 36.0	17.26	4 48.05	0.383	7 5 50.41
Sat.	9	7 14 44.01	10.223	22 20 30.0	18.23	4 57.04	0.367	7 9 46.97
SUN.	10	7 18 49.18	10.207	22 13 1.0	-19.19	5 5.65	0.350	7 13 43.53
Mon.	11	7 22 53.93	10.189	22 5 8.8	20.15	5 13.84	0.333	7 17 40.09
Tues.	12	7 26 58.26	10.171	21 56 53.9	21.10	5 21.62	0.315	7 21 36.64
Wed.	13	7 31 2.14	10.152	21 48 16.3	-22.03	5 28.94	0.296	7 25 33.20
Thur.	14	7 35 5.57	10.132	21 39 16.3	22.96	5 35.81	0.276	7 29 29.76
Frid.	15	7 39 8.52	10.112	21 29 54.0	23.89	5 42.20	0.256	7 33 26.32
Sat.	16	7 43 10.98	10.092	21 20 9.7	-24.80	5 48.10	0.235	7 37 22.88
SUN.	17	7 47 12.94	10.071	21 10 3.6	25.70	5 53.51	0.214	7 41 19.43
Mon.	18	7 51 14.37	10.049	20 59 36.0	26.59	5 58.38	0.192	7 45 15.99
Tues.	19	7 55 15.27	10.026	20 48 47.0	-27.48	6 2.72	0.169	7 49 12.55
Wed.	20	7 59 15.61	10.003	20 37 37.0	28.35	6 6.51	0.146	7 53 9.10
Thur.	21	8 3 15.39	9.979	20 26 6.2	29.21	6 9.73	0.122	7 57 5.66
Frid.	22	8 7 14.60	9.955	20 14 14.8	-30.06	6 12.38	0.098	8 1 2.22
Sat.	23	8 11 13.22	9.930	20 2 3.2	30.90	6 14.44	0.074	8 4 58.78
SUN.	24	8 15 11.24	9.905	19 49 31.6	31.73	6 15.91	0.049	8 8 55.33
Mon.	25	8 19 8.66	9.880	19 36 40.2	-32.54	6 16.77	0.023	8 12 51.89
Tues.	26	8 23 5.46	9.854	19 23 29.4	33.34	6 17.01	0.002	8 16 48.45
Wed.	27	8 27 1.66	9.829	19 9 59.4	34.14	6 16.66	0.028	8 20 45.00
Thur.	28	8 30 57.24	9.803	18 56 10.5	-34.93	6 15.68	0.054	8 24 41.56
Frid.	29	8 34 52.20	9.777	18 42 2.9	35.70	6 14.08	0.079	8 28 38.12
Sat.	30	8 38 46.55	9.752	18 27 37.0	36.46	6 11.88	0.105	8 32 34.67
SUN.	31	8 42 40.28	9.726	18 12 52.9	37.21	6 9.05	0.131	8 36 31.23
Mon.	32	8 46 33.39	9.700	N. 17 57 51.0	-37.95	6 5.61	0.156	8 40 27.78

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour,  
+ 9<sup>s</sup> 8565.  
(Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	182	99 36 57.5	36 15.7	142.96	— 0.47	0.0071958	+ 0.8	17 18 54.83
2	183	100 34 8.3	33 26.4	142.95	0.35	0.0071968	+ 0.2	17 14 58.91
3	184	101 31 19.0	30 36.9	142.95	0.22	0.0071963	— 0.4	17 11 3.00
4	185	102 28 29.7	27 47.4	142.95	— 0.09	0.0071944	— 1.0	17 7 7.09
5	186	103 25 40.5	24 58.0	142.95	+ 0.05	0.0071910	1.6	17 3 11.18
6	187	104 22 51.5	22 8.8	142.96	0.18	0.0071861	2.3	16 59 15.27
7	188	105 20 2.7	19 19.9	142.97	+ 0.29	0.0071798	— 3.0	16 55 19.35
8	189	106 17 14.2	16 31.2	142.99	0.38	0.0071718	3.7	16 51 23.44
9	190	107 14 26.2	13 43.0	143.01	0.44	0.0071622	4.4	16 47 27.53
10	191	108 11 38.6	10 55.2	143.03	+ 0.48	0.0071508	— 5.2	16 43 31.62
11	192	109 8 51.5	8 7.9	143.05	0.48	0.0071375	6.0	16 39 35.70
12	193	110 6 5.0	5 21.3	143.07	0.46	0.0071222	6.9	16 35 39.79
13	194	111 3 19.1	2 35.2	143.10	+ 0.40	0.0071045	— 7.8	16 31 43.88
14	195	111 60 33.7	59 49.6	143.12	0.32	0.0070847	8.8	16 27 47.97
15	196	112 57 49.0	57 4.7	143.15	0.21	0.0070624	9.8	16 23 52.06
16	197	113 55 4.8	54 20.4	143.17	+ 0.11	0.0070377	— 10.8	16 19 56.15
17	198	114 52 21.2	51 36.6	143.19	— 0.02	0.0070102	11.9	16 16 0.24
18	199	115 49 38.1	48 53.4	143.21	0.16	0.0069805	13.0	16 12 4.32
19	200	116 46 55.5	46 10.6	143.23	— 0.28	0.0069480	— 14.1	16 8 8.41
20	201	117 44 13.4	43 28.3	143.25	0.40	0.0069130	15.2	16 4 12.50
21	202	118 41 31.8	40 46.5	143.27	0.50	0.0068753	16.2	16 0 16.59
22	203	119 38 50.6	38 5.2	143.29	— 0.58	0.0068352	— 17.2	15 56 20.68
23	204	120 36 9.8	35 24.2	143.31	0.63	0.0067929	18.1	15 52 24.77
24	205	121 33 29.5	32 43.7	143.33	0.65	0.0067481	19.0	15 48 28.86
25	206	122 30 49.5	30 3.5	143.35	— 0.64	0.0067013	— 19.9	15 44 32.95
26	207	123 28 9.9	27 23.8	143.37	0.60	0.0066525	20.7	15 40 37.03
27	208	124 25 31.0	24 44.7	143.39	0.53	0.0066018	21.5	15 36 41.12
28	209	125 22 52.4	22 6.0	143.41	— 0.44	0.0065495	— 22.2	15 32 45.21
29	210	126 20 14.3	19 27.7	143.43	0.33	0.0064955	22.8	15 28 49.30
30	211	127 17 37.0	16 50.3	143.46	0.21	0.0064402	23.4	15 24 53.39
31	212	128 15 0.3	14 13.4	143.49	— 0.08	0.0063832	24.0	15 20 57.48
32	213	129 12 24.4	11 37.4	143.52	+ 0.07	0.0063252	— 24.5	15 17 1.57
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0.0								
								Diff. for 1 Hour — 9 <sup>h</sup> .8296. (Table II.)



GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.	
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.	
	' "	' "	' "	"	' "	"	h m	m	d	
1	16 33.9	16 38.4	60 41.0	+1.55	60 57.8	+1.23	10 0.7	2.72	12.3	
2	16 41.9	16 44.1	61 10.6	0.88	61 18.8	+0.48	11 6.7	2.75	13.3	
3	16 45.1	16 44.6	61 22.2	+0.08	61 20.6	-0.34	12 11.9	2.66	14.3	
4	16 42.8	16 39.7	61 14.0	-0.75	61 2.6	-1.13	13 13.6	2.48	15.3	
5	16 35.5	16 30.1	60 46.9	1.48	60 27.2	1.77	14 10.6	2.28	16.3	
6	16 23.9	16 17.0	60 4.4	2.00	59 39.1	2.19	15 3.1	2.10	17.3	
7	16 9.6	16 1.9	59 11.9	-2.31	58 43.6	-2.38	15 52.0	1.98	18.3	
8	15 54.1	15 46.3	58 14.9	2.39	57 46.3	2.36	16 38.7	1.91	19.3	
9	15 38.7	15 31.4	57 18.3	2.28	56 51.5	2.18	17 24.3	1.89	20.3	
10	15 24.4	15 18.0	56 26.1	-2.04	56 2.5	-1.89	18 9.9	1.91	21.3	
11	15 12.1	15 6.8	55 40.7	1.73	55 21.1	1.55	18 56.3	1.96	22.3	
12	15 2.0	14 57.8	55 3.6	1.37	54 48.3	1.19	19 44.1	2.02	23.3	
13	14 54.2	14 51.2	54 35.1	-1.01	54 24.1	-0.83	20 33.1	2.07	24.3	
14	14 48.8	14 46.9	54 15.2	0.66	54 8.2	0.50	21 23.0	2.09	25.3	
15	14 45.5	14 44.6	54 3.1	0.35	53 59.9	-0.20	22 13.2	2.08	26.3	
16	14 44.2	14 44.2	53 58.3	-0.07	53 58.3	+0.06	23 2.5	2.03	27.3	
17	14 44.6	14 45.4	53 59.8	+0.18	54 2.7	0.30	23 50.4	1.96	28.3	
18	14 46.5	14 48.0	54 6.9	0.40	54 12.4	0.51	6		29.3	
19	14 49.9	14 52.0	54 19.1	+0.61	54 27.0	+0.71	0 36.5	1.88	0.7	
20	14 54.5	14 57.3	54 36.1	0.81	54 46.4	0.91	1 20.7	1.81	1.7	
21	15 0.4	15 3.9	54 57.9	1.01	55 10.6	1.11	2 3.7	1.77	2.7	
22	15 7.7	15 11.8	55 24.5	+1.21	55 39.6	+1.32	2 46.1	1.76	3.7	
23	15 16.3	15 21.1	55 56.1	1.43	56 13.8	1.53	3 28.7	1.80	4.7	
24	15 26.3	15 31.8	56 32.8	1.63	56 53.0	1.73	4 12.7	1.88	5.7	
25	15 37.5	15 43.6	57 14.2	+1.81	57 36.4	+1.88	4 59.3	2.01	6.7	
26	15 49.8	15 56.1	57 59.2	1.92	58 22.5	1.95	5 49.6	2.18	7.7	
27	16 2.5	16 8.7	58 45.8	1.93	59 8.8	1.89	6 44.4	2.38	8.7	
28	16 14.8	16 20.5	59 31.1	+1.80	59 52.1	+1.67	7 43.8	2.55	9.7	
29	16 25.7	16 30.2	60 11.1	1.48	60 27.6	1.25	8 46.8	2.67	10.7	
30	16 33.9	16 36.6	60 41.1	0.98	60 51.1	+0.67	9 51.1	2.67	11.7	
31	16 38.2	16 38.7	60 57.1	+0.32	60 58.8	-0.05	10 54.0	2.56	12.7	
32	16 37.9	16 36.0	60 56.0	-0.42	60 48.8	-0.78	11 53.4	2.39	13.7	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 1.					SUNDAY 3.				
0	16 13 9.05	a.7172	S.24 46 31.1	4.143	0	18 26 35.38	a.7672	S.24 23 2.4	5.195
1	16 15 52.24	a.7226	24 50 34.3	3.962	1	18 29 21.30	a.7634	24 17 45.0	5.383
2	16 18 35.76	a.7279	24 54 26.6	3.780	2	18 32 6.99	a.7595	24 12 16.4	5.570
3	16 21 19.59	a.7330	24 58 7.9	3.597	3	18 34 52.44	a.7555	24 6 36.6	5.756
4	16 24 3.72	a.7379	25 1 38.2	3.412	4	18 37 37.65	a.7518	24 0 45.7	5.941
5	16 26 48.14	a.7427	25 4 57.3	3.226	5	18 40 22.59	a.7467	23 54 43.7	6.124
6	16 29 32.85	a.7474	25 8 5.3	3.039	6	18 43 7.26	a.7422	23 48 30.8	6.306
7	16 32 17.83	a.7518	25 11 2.0	2.851	7	18 45 51.66	a.7376	23 42 7.0	6.487
8	16 35 3.07	a.7562	25 13 47.4	2.662	8	18 48 35.77	a.7327	23 35 32.4	6.666
9	16 37 48.57	a.7603	25 16 21.5	2.472	9	18 51 19.59	a.7277	23 28 47.1	6.843
10	16 40 34.31	a.7642	25 18 44.1	2.281	10	18 54 3.10	a.7226	23 21 51.2	7.020
11	16 43 20.28	a.7680	25 20 55.2	2.089	11	18 56 46.30	a.7173	23 14 44.7	7.195
12	16 46 6.47	a.7716	25 22 54.8	1.896	12	18 59 29.18	a.7119	23 7 27.8	7.368
13	16 48 52.87	a.7750	25 24 42.7	1.702	13	19 2 11.73	a.7069	23 0 0.5	7.540
14	16 51 39.47	a.7782	25 26 19.0	1.507	14	19 4 53.94	a.7007	22 52 23.0	7.710
15	16 54 26.25	a.7812	25 27 43.6	1.312	15	19 7 35.81	a.6948	22 44 35.3	7.878
16	16 57 13.21	a.7840	25 28 56.5	1.117	16	19 10 17.32	a.6888	22 36 37.6	8.045
17	17 0 0.33	a.7867	25 29 57.6	0.920	17	19 12 58.47	a.6829	22 28 29.9	8.210
18	17 2 47.61	a.7891	25 30 46.9	0.722	18	19 15 39.27	a.6768	22 20 12.4	8.373
19	17 5 35.02	a.7913	25 31 24.3	0.525	19	19 18 19.69	a.6705	22 11 45.2	8.534
20	17 8 22.56	a.7932	25 31 49.9	0.327	20	19 20 59.73	a.6642	22 3 8.3	8.694
21	17 11 10.21	a.7950	25 32 3.5	-0.128	21	19 23 39.39	a.6577	21 54 21.9	8.852
22	17 13 57.96	a.7967	25 32 5.3	+0.070	22	19 26 18.66	a.6512	21 45 26.1	9.008
23	17 16 45.81	a.7981	S.25 31 55.1	0.271	23	19 28 57.54	a.6447	S.21 36 20.9	9.162
SATURDAY 2.					MONDAY 4.				
0	17 19 33.73	a.7993	S.25 31 32.8	0.471	0	19 31 36.02	a.6379	S.21 27 6.6	9.314
1	17 22 21.72	a.8003	25 30 58.6	0.670	1	19 34 14.09	a.6311	21 17 43.2	9.464
2	17 25 9.77	a.8011	25 30 12.4	0.870	2	19 36 51.75	a.6242	21 8 10.9	9.612
3	17 27 57.85	a.8016	25 29 14.2	1.070	3	19 39 28.99	a.6172	20 58 29.8	9.758
4	17 30 45.96	a.8020	25 28 4.0	1.270	4	19 42 5.82	a.6102	20 48 39.9	9.902
5	17 33 34.09	a.8022	25 26 41.8	1.470	5	19 44 42.22	a.6032	20 38 41.5	10.044
6	17 36 22.22	a.8022	25 25 7.6	1.670	6	19 47 18.20	a.5961	20 28 34.6	10.184
7	17 39 10.35	a.8019	25 23 21.4	1.870	7	19 49 53.75	a.5889	20 18 19.4	10.322
8	17 41 58.45	a.8014	25 21 23.2	2.069	8	19 52 38.87	a.5817	20 7 55.9	10.458
9	17 44 46.52	a.8007	25 19 13.1	2.268	9	19 55 3.55	a.5743	19 57 24.4	10.592
10	17 47 34.54	a.7999	25 16 51.0	2.468	10	19 57 37.79	a.5670	19 46 44.9	10.724
11	17 50 22.51	a.7988	25 14 16.9	2.667	11	20 0 11.59	a.5597	19 35 57.5	10.853
12	17 53 10.40	a.7975	25 11 30.9	2.866	12	20 2 44.95	a.5522	19 25 2.5	10.981
13	17 55 58.21	a.7961	25 8 33.0	3.063	13	20 5 17.86	a.5447	19 13 59.8	11.107
14	17 58 45.93	a.7944	25 5 23.3	3.261	14	20 7 50.32	a.5373	19 2 49.7	11.230
15	18 1 33.54	a.7926	25 2 1.7	3.458	15	20 10 22.34	a.5299	18 51 32.3	11.351
16	18 4 21.04	a.7905	24 58 28.3	3.654	16	20 12 53.91	a.5224	18 40 7.6	11.470
17	18 7 8.40	a.7882	24 54 43.2	3.849	17	20 15 25.03	a.5148	18 28 35.9	11.587
18	18 9 55.63	a.7858	24 50 46.4	4.044	18	20 17 55.69	a.5072	18 16 57.2	11.702
19	18 12 42.70	a.7832	24 46 37.9	4.238	19	20 20 25.90	a.4997	18 5 11.7	11.814
20	18 15 29.61	a.7803	24 42 17.8	4.431	20	20 22 55.66	a.4922	17 53 19.5	11.925
21	18 18 16.34	a.7773	24 37 46.2	4.623	21	20 25 24.96	a.4846	17 41 20.7	12.033
22	18 21 2.89	a.7742	24 33 3.0	4.815	22	20 27 53.81	a.4770	17 29 15.5	12.139
23	18 23 49.24	a.7708	24 28 8.4	5.005	23	20 30 22.20	a.4694	17 17 4.0	12.243
24	18 26 35.38	a.7672	S.24 23 2.4	5.195	24	20 32 50.14	a.4619	S.17 4 46.3	12.345

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 5.					THURSDAY 7.				
0	20 32 50.14	2.4619	S. 17 4 46.3	12.345	0	22 22 59.42	2.1501	S. 5 53 45.9	14.887
1	20 35 17.63	2.4544	16 52 22.6	12.445	1	22 25 8.28	2.1453	5 38 52.4	14.896
2	20 37 44.67	2.4468	16 39 52.9	12.542	2	22 27 16.85	2.1405	5 23 58.4	14.904
3	20 40 11.25	2.4392	16 27 17.5	12.638	3	22 29 25.14	2.1358	5 9 3.9	14.911
4	20 42 37.38	2.4318	16 14 36.4	12.732	4	22 31 33.15	2.1312	4 54 9.1	14.916
5	20 45 3.07	2.4244	16 1 49.7	12.823	5	22 33 40.88	2.1267	4 39 14.0	14.919
6	20 47 28.31	2.4169	15 48 57.7	12.911	6	22 35 48.35	2.1223	4 24 18.8	14.922
7	20 49 53.10	2.4094	15 36 0.4	12.998	7	22 37 55.55	2.1179	4 9 23.4	14.923
8	20 52 17.44	2.4020	15 22 57.9	13.083	8	22 40 2.50	2.1137	3 54 28.0	14.923
9	20 54 42.34	2.3947	15 9 50.4	13.166	9	22 42 9.19	2.1094	3 39 32.7	14.921
10	20 57 4.80	2.3873	14 56 38.0	13.247	10	22 44 15.63	2.1053	3 24 37.5	14.917
11	20 59 27.82	2.3800	14 43 20.8	13.325	11	22 46 21.82	2.1012	3 9 42.6	14.912
12	21 1 59.40	2.3727	14 29 59.0	13.401	12	22 48 27.78	2.0973	2 54 48.0	14.907
13	21 4 12.54	2.3655	14 16 32.7	13.476	13	22 50 33.50	2.0935	2 39 53.8	14.900
14	21 6 34.26	2.3583	14 3 1.9	13.548	14	22 52 39.00	2.0897	2 25 0.0	14.892
15	21 8 55.54	2.3512	13 49 26.9	13.618	15	22 54 44.27	2.0860	2 10 6.8	14.881
16	21 11 16.40	2.3442	13 35 47.7	13.687	16	22 56 49.32	2.0824	1 55 14.3	14.870
17	21 13 36.84	2.3371	13 22 4.5	13.753	17	22 58 54.16	2.0788	1 40 22.4	14.858
18	21 15 56.85	2.3300	13 8 17.3	13.817	18	23 0 58.78	2.0753	1 25 31.3	14.845
19	21 18 16.44	2.3231	12 54 26.4	13.879	19	23 3 3.20	2.0720	1 10 41.0	14.830
20	21 20 35.62	2.3162	12 40 31.8	13.940	20	23 5 7.42	2.0687	0 55 51.7	14.813
21	21 22 54.39	2.3094	12 26 33.6	13.998	21	23 7 12.45	2.0655	0 41 3.4	14.797
22	21 25 12.75	2.3026	12 12 32.0	14.054	22	23 9 17.28	2.0623	0 26 16.1	14.776
23	21 27 30.70	2.2958	S. 11 58 27.1	14.108	23	23 11 18.93	2.0595	S. 0 11 30.0	14.758
WEDNESDAY 6.					FRIDAY 8.				
0	21 29 48.24	2.2891	S. 11 44 19.0	14.161	0	23 13 22.40	2.0564	N. 0 3 14.9	14.737
1	21 32 5.39	2.2826	11 30 7.8	14.212	1	23 15 25.70	2.0535	0 17 58.5	14.716
2	21 34 22.15	2.2761	11 15 53.6	14.261	2	23 17 28.82	2.0507	0 32 40.8	14.693
3	21 36 38.52	2.2696	11 1 36.5	14.307	3	23 19 31.78	2.0479	0 47 21.7	14.669
4	21 38 54.50	2.2632	10 47 16.7	14.352	4	23 21 34.57	2.0452	1 2 1.1	14.643
5	21 41 10.10	2.2568	10 32 54.2	14.396	5	23 23 37.21	2.0427	1 16 38.9	14.617
6	21 43 25.32	2.2506	10 18 29.2	14.437	6	23 25 39.70	2.0403	1 31 15.1	14.590
7	21 45 40.17	2.2443	10 4 1.8	14.476	7	23 27 42.05	2.0379	1 45 49.7	14.562
8	21 47 54.64	2.2382	9 49 32.1	14.514	8	23 29 44.25	2.0355	2 0 22.5	14.532
9	21 50 8.75	2.2321	9 35 0.1	14.551	9	23 31 46.31	2.0332	2 14 53.5	14.502
10	21 52 22.49	2.2261	9 20 26.0	14.584	10	23 33 48.24	2.0311	2 29 22.7	14.470
11	21 54 35.88	2.2202	9 5 50.0	14.617	11	23 35 50.04	2.0290	2 43 49.9	14.437
12	21 56 48.91	2.2143	8 51 12.0	14.647	12	23 37 51.72	2.0270	2 58 15.1	14.402
13	21 59 1.60	2.2085	8 36 32.3	14.676	13	23 39 53.28	2.0251	3 12 38.2	14.367
14	22 1 13.94	2.2028	8 21 50.9	14.703	14	23 41 54.73	2.0232	3 26 59.2	14.332
15	22 3 25.94	2.1972	8 7 7.9	14.728	15	23 43 56.06	2.0213	3 41 18.1	14.296
16	22 5 37.61	2.1917	7 52 23.5	14.753	16	23 45 57.29	2.0197	3 55 34.7	14.258
17	22 7 48.94	2.1862	7 37 37.6	14.776	17	23 47 58.42	2.0181	4 9 49.0	14.219
18	22 9 59.95	2.1808	7 22 50.4	14.796	18	23 49 59.46	2.0165	4 24 1.0	14.179
19	22 12 10.64	2.1753	7 8 2.1	14.814	19	23 52 0.40	2.0149	4 38 10.5	14.138
20	22 14 21.01	2.1700	6 53 12.7	14.832	20	23 54 1.25	2.0135	4 52 17.6	14.097
21	22 16 31.07	2.1651	6 38 22.3	14.848	21	23 56 2.02	2.0122	5 6 22.2	14.055
22	22 18 40.82	2.1600	6 23 31.0	14.862	22	23 58 2.72	2.0110	5 20 24.2	14.012
23	22 20 50.27	2.1550	6 8 38.8	14.876	23	0 0 3.34	2.0098	5 34 23.6	13.967
24	22 22 59.42	2.1501	S. 5 53 45.9	14.887	24	0 2 3.90	2.0087	N. 5 48 20.2	13.921

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 9.					MONDAY 11.				
0	h m s	s	N. ° ' "	"	0	h m s	s	N. ° ' "	"
0	0 2 3.90	2.0087	5 48 20.2	13.921	0	1 38 24.11	2.0268	15 49 10.2	10.827
1	0 4 4.39	2.0076	6 2 14.1	13.876	1	1 40 25.77	2.0285	15 59 57.4	10.746
2	0 6 4.81	2.0066	6 16 5.3	13.829	2	1 42 27.53	2.0301	16 10 39.7	10.663
3	0 8 5.18	2.0057	6 29 53.6	13.781	3	1 44 29.38	2.0318	16 21 17.0	10.580
4	0 10 5.50	2.0048	6 43 39.0	13.732	4	1 46 31.34	2.0335	16 31 49.3	10.497
5	0 12 5.76	2.0040	6 57 21.5	13.683	5	1 48 33.40	2.0352	16 42 16.6	10.412
6	0 14 5.98	2.0033	7 11 1.0	13.632	6	1 50 35.56	2.0370	16 52 38.8	10.327
7	0 16 6.16	2.0027	7 24 37.4	13.582	7	1 52 37.84	2.0388	17 2 55.9	10.242
8	0 18 6.31	2.0022	7 38 10.8	13.530	8	1 54 40.22	2.0406	17 13 7.8	10.155
9	0 20 6.42	2.0016	7 51 41.0	13.477	9	1 56 42.71	2.0424	17 23 14.5	10.068
10	0 22 6.50	2.0012	8 5 8.0	13.422	10	1 58 45.31	2.0442	17 33 16.0	9.981
11	0 24 6.56	2.0008	8 18 31.7	13.367	11	2 0 48.02	2.0460	17 43 12.2	9.893
12	0 26 6.60	2.0005	8 31 52.1	13.312	12	2 2 50.85	2.0482	17 53 3.2	9.805
13	0 28 6.62	2.0002	8 45 9.2	13.257	13	2 4 53.80	2.0501	18 2 48.8	9.715
14	0 30 6.63	2.0001	8 58 22.9	13.200	14	2 6 56.86	2.0521	18 12 29.0	9.625
15	0 32 6.63	1.9999	9 11 33.2	13.142	15	2 9 0.05	2.0541	18 22 3.8	9.535
16	0 34 6.62	1.9998	9 24 40.0	13.083	16	2 11 3.35	2.0561	18 31 33.2	9.444
17	0 36 6.61	1.9999	9 37 43.2	13.024	17	2 13 6.78	2.0582	18 40 57.1	9.352
18	0 38 6.61	2.0000	9 50 42.9	12.964	18	2 15 10.33	2.0602	18 50 15.5	9.260
19	0 40 6.61	2.0001	10 3 38.9	12.903	19	2 17 14.00	2.0623	18 59 28.3	9.167
20	0 42 6.62	2.0003	10 16 31.3	12.842	20	2 19 17.80	2.0644	19 8 35.5	9.073
21	0 44 6.65	2.0006	10 29 19.9	12.779	21	2 21 21.73	2.0665	19 17 37.1	8.979
22	0 46 6.69	2.0008	10 42 4.8	12.717	22	2 23 25.78	2.0686	19 26 33.0	8.884
23	0 48 6.75	2.0012	N. 10 54 45.9	12.652	23	2 25 29.96	2.0707	N. 19 35 23.2	8.789
SUNDAY 10.					TUESDAY 12.				
0	h m s	s	N. ° ' "	"	0	h m s	s	N. ° ' "	"
0	0 50 6.83	2.0016	N. 11 7 23.1	12.587	0	2 27 34.27	2.0729	N. 19 44 7.7	8.693
1	0 52 6.94	2.0021	11 19 56.4	12.522	1	2 29 38.71	2.0751	19 52 46.4	8.597
2	0 54 7.08	2.0027	11 32 25.8	12.457	2	2 31 43.28	2.0772	20 1 19.4	8.501
3	0 56 7.26	2.0032	11 44 51.2	12.390	3	2 33 47.98	2.0794	20 9 46.5	8.403
4	0 58 7.47	2.0038	11 57 12.6	12.322	4	2 35 52.81	2.0816	20 18 7.7	8.304
5	1 0 7.72	2.0046	12 9 29.9	12.254	5	2 37 57.77	2.0838	20 26 23.0	8.206
6	1 2 8.02	2.0053	12 21 43.1	12.186	6	2 40 2.86	2.0860	20 34 32.4	8.107
7	1 4 8.36	2.0061	12 33 52.2	12.116	7	2 42 8.09	2.0882	20 42 35.8	8.007
8	1 6 8.75	2.0070	12 45 57.0	12.045	8	2 44 13.44	2.0903	20 50 33.2	7.907
9	1 8 9.20	2.0079	12 57 57.6	11.975	9	2 46 18.93	2.0926	20 58 24.6	7.806
10	1 10 9.70	2.0088	13 9 54.0	11.903	10	2 48 24.55	2.0948	21 6 9.9	7.704
11	1 12 10.26	2.0098	13 21 46.0	11.831	11	2 50 30.31	2.0971	21 13 49.1	7.602
12	1 14 10.88	2.0109	13 33 33.7	11.757	12	2 52 36.20	2.0993	21 21 22.1	7.499
13	1 16 11.57	2.0120	13 45 16.9	11.683	13	2 54 42.22	2.1015	21 28 49.0	7.397
14	1 18 12.32	2.0131	13 56 55.7	11.609	14	2 56 48.38	2.1037	21 36 9.7	7.293
15	1 20 13.14	2.0143	14 8 30.0	11.534	15	2 58 54.66	2.1058	21 43 24.2	7.189
16	1 22 14.04	2.0156	14 19 59.8	11.458	16	3 1 1.08	2.1080	21 50 32.4	7.085
17	1 24 15.01	2.0168	14 31 25.0	11.382	17	3 3 7.62	2.1102	21 57 34.4	6.980
18	1 26 16.05	2.0181	14 42 45.6	11.304	18	3 5 14.30	2.1124	22 4 30.0	6.874
19	1 28 17.18	2.0195	14 54 1.5	11.227	19	3 7 21.11	2.1146	22 11 19.3	6.768
20	1 30 18.39	2.0209	15 5 12.8	11.148	20	3 9 28.05	2.1167	22 18 2.2	6.662
21	1 32 19.69	2.0224	15 16 19.3	11.069	21	3 11 35.11	2.1188	22 24 38.7	6.555
22	1 34 21.08	2.0238	15 27 21.1	10.990	22	3 13 42.31	2.1210	22 31 8.8	6.447
23	1 36 22.55	2.0253	15 38 18.1	10.909	23	3 15 49.63	2.1230	22 37 32.4	6.339
24	1 38 24.11	2.0268	N. 15 49 10.2	10.827	24	3 17 57.07	2.1251	N. 22 43 49.5	6.231

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 13.					FRIDAY 15.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	3 17 57.07	2.1851	N.22 43 49.5	6.231	0	5 1 47 36	2.1852	N.25 30 45.8	0.620
1	3 20 4.64	2.1872	22 50 0.1	6.182	1	5 3 58.47	2.1852	25 31 19.4	0.499
2	3 22 12.34	2.1892	22 56 4.1	6.012	2	5 6 9.59	2.1852	25 31 45.7	0.377
3	3 24 20.15	2.1912	23 2 1.6	5.902	3	5 8 20.70	2.1852	25 32 4.7	0.256
4	3 26 28.09	2.1933	23 7 52.4	5.792	4	5 10 31.81	2.1851	25 32 16.4	0.134
5	3 28 36.15	2.1953	23 13 36.6	5.682	5	5 12 42.91	2.1849	25 32 20.8	+ 0.012
6	3 30 44.33	2.1973	23 19 14.2	5.571	6	5 14 54.00	2.1847	25 32 17.9	- 0.109
7	3 32 52.63	2.1992	23 24 45.1	5.459	7	5 17 5.08	2.1844	25 32 7.7	0.230
8	3 35 1.04	2.1411	23 30 9.3	5.347	8	5 19 16.13	2.1840	25 31 50.3	0.352
9	3 37 9.56	2.1430	23 35 26.7	5.234	9	5 21 27.16	2.1836	25 31 25.5	0.473
10	3 39 18.20	2.1449	23 40 37.4	5.122	10	5 23 38.16	2.1832	25 30 53.5	0.594
11	3 41 26.95	2.1467	23 45 41.3	5.009	11	5 25 49.14	2.1827	25 30 14.2	0.715
12	3 43 35.81	2.1486	23 50 38.5	4.896	12	5 28 0.08	2.1821	25 29 27.7	0.836
13	3 45 44.78	2.1503	23 55 28.8	4.781	13	5 30 10.99	2.1814	25 28 33.9	0.957
14	3 47 53.85	2.1520	24 0 12.2	4.667	14	5 32 21.85	2.1807	25 27 32.9	1.077
15	3 50 3.02	2.1537	24 4 48.8	4.552	15	5 34 32.67	2.1799	25 26 24.6	1.198
16	3 52 12.30	2.1554	24 9 18.4	4.437	16	5 36 43.44	2.1792	25 25 9.1	1.319
17	3 54 21.67	2.1570	24 13 41.2	4.322	17	5 38 54.17	2.1783	25 23 46.3	1.440
18	3 56 31.14	2.1587	24 17 57.0	4.205	18	5 41 4.84	2.1773	25 22 16.3	1.560
19	3 58 40.71	2.1602	24 22 5.8	4.089	19	5 43 15.45	2.1763	25 20 39.1	1.680
20	4 0 50.37	2.1617	24 26 7.7	3.973	20	5 45 26.00	2.1753	25 18 54.7	1.799
21	4 3 0.12	2.1632	24 30 2.6	3.857	21	5 47 36.49	2.1742	25 17 3.2	1.918
22	4 5 9.95	2.1646	24 33 50.5	3.739	22	5 49 46.91	2.1731	25 15 4.5	2.038
23	4 7 19.87	2.1661	N.24 37 31.3	3.622	23	5 51 57.26	2.1718	N.25 12 58.6	2.157
THURSDAY 14.					SATURDAY 16.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	4 9 29.88	2.1675	N.24 41 5.1	3.504	0	5 54 7.53	2.1706	N.25 10 45.6	2.276
1	4 11 39.97	2.1688	24 44 31.8	3.387	1	5 56 17.73	2.1692	25 8 25.5	2.394
2	4 13 50.13	2.1700	24 47 51.5	3.268	2	5 58 27.84	2.1678	25 5 58.3	2.513
3	4 16 0.37	2.1712	24 51 4.0	3.150	3	6 0 37.87	2.1665	25 3 23.9	2.632
4	4 18 10.68	2.1724	24 54 9.5	3.032	4	6 2 47.82	2.1650	25 0 42.5	2.749
5	4 20 21.06	2.1735	24 57 7.8	2.912	5	6 4 57.67	2.1634	24 57 54.0	2.867
6	4 22 31.50	2.1746	24 59 58.9	2.792	6	6 7 7.43	2.1618	24 54 58.5	2.983
7	4 24 42.01	2.1757	25 2 42.9	2.673	7	6 9 17.09	2.1602	24 51 56.0	3.101
8	4 26 52.58	2.1766	25 5 19.7	2.554	8	6 11 26.65	2.1585	24 48 46.4	3.217
9	4 29 3.20	2.1775	25 7 49.4	2.435	9	6 13 36.11	2.1568	24 45 29.9	3.333
10	4 31 13.88	2.1784	25 10 11.9	2.314	10	6 15 45.47	2.1551	24 42 6.4	3.449
11	4 33 24.61	2.1793	25 12 27.1	2.193	11	6 17 54.72	2.1532	24 38 36.0	3.564
12	4 35 35.39	2.1801	25 14 35.1	2.073	12	6 20 3.85	2.1513	24 34 58.7	3.679
13	4 37 46.22	2.1808	25 16 35.9	1.953	13	6 22 12.87	2.1494	24 31 14.5	3.794
14	4 39 57.09	2.1814	25 18 29.5	1.832	14	6 24 21.78	2.1474	24 27 23.4	3.909
15	4 42 7.99	2.1820	25 20 15.8	1.712	15	6 26 30.56	2.1453	24 23 25.4	4.022
16	4 44 18.93	2.1827	25 21 54.9	1.591	16	6 28 39.22	2.1433	24 19 20.7	4.136
17	4 46 29.91	2.1832	25 23 26.7	1.470	17	6 30 47.76	2.1412	24 15 9.1	4.249
18	4 48 40.91	2.1836	25 24 51.3	1.349	18	6 32 56.17	2.1391	24 10 50.8	4.362
19	4 50 51.94	2.1840	25 26 8.6	1.227	19	6 35 4.45	2.1369	24 6 25.7	4.474
20	4 53 2.99	2.1843	25 27 18.6	1.107	20	6 37 12.60	2.1347	24 1 53.9	4.586
21	4 55 14.06	2.1847	25 28 21.4	0.985	21	6 39 20.61	2.1324	23 57 15.4	4.697
22	4 57 25.15	2.1849	25 29 16.8	0.863	22	6 41 28.49	2.1301	23 52 30.3	4.807
23	4 59 36.25	2.1851	25 30 5.0	0.742	23	6 43 36.22	2.1277	23 47 38.5	4.918
24	5 1 47.36	2.1852	N.25 30 45.8	0.620	24	6 45 43.82	2.1254	N.23 42 40.1	5.027

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 17.					TUESDAY 19.				
0	6 45 43.82	2.1234	N. 23 42 40.1	3.087	0	8 24 33.78	1.9891	N. 17 45 51.3	9.589
1	6 47 51.27	2.1289	23 37 35.2	5.137	1	8 26 33.04	1.9862	17 36 13.6	9.667
2	6 49 58.57	2.1305	23 32 23.7	5.247	2	8 28 32.13	1.9834	17 26 31.3	9.744
3	6 52 5.73	2.1180	23 27 5.6	5.355	3	8 30 31.05	1.9806	17 16 44.3	9.822
4	6 54 12.73	2.1154	23 21 41.1	5.462	4	8 32 29.80	1.9778	17 6 52.7	9.898
5	6 56 19.58	2.1129	23 16 10.2	5.569	5	8 34 28.39	1.9751	16 56 56.6	9.972
6	6 58 26.28	2.1103	23 10 32.8	5.676	6	8 36 26.81	1.9723	16 46 56.0	10.047
7	7 0 32.82	2.1078	23 4 49.1	5.782	7	8 38 25.06	1.9695	16 36 51.0	10.120
8	7 2 39.21	2.1052	22 58 59.0	5.887	8	8 40 23.15	1.9668	16 26 41.6	10.193
9	7 4 45.44	2.1024	22 53 2.6	5.992	9	8 42 21.08	1.9642	16 16 27.8	10.266
10	7 6 51.50	2.0997	22 46 59.9	6.097	10	8 44 18.85	1.9615	16 6 9.7	10.337
11	7 8 57.40	2.0970	22 40 50.9	6.202	11	8 46 16.46	1.9589	15 55 47.4	10.407
12	7 11 3.14	2.0942	22 34 35.7	6.305	12	8 48 13.92	1.9563	15 45 20.8	10.477
13	7 13 8.71	2.0915	22 28 14.3	6.407	13	8 50 11.22	1.9537	15 34 50.1	10.547
14	7 15 14.12	2.0887	22 21 46.8	6.509	14	8 52 8.37	1.9512	15 24 15.2	10.615
15	7 17 19.36	2.0859	22 15 13.2	6.611	15	8 54 5.36	1.9487	15 13 36.3	10.683
16	7 19 24.43	2.0831	22 8 33.5	6.712	16	8 56 2.21	1.9462	15 2 53.3	10.750
17	7 21 29.33	2.0802	22 1 47.8	6.812	17	8 57 58.90	1.9437	14 52 6.3	10.816
18	7 23 34.06	2.0774	21 54 56.1	6.912	18	8 59 55.45	1.9413	14 41 15.4	10.881
19	7 25 38.62	2.0745	21 47 58.4	7.011	19	9 1 51.86	1.9389	14 30 20.6	10.946
20	7 27 43.00	2.0716	21 40 54.8	7.109	20	9 3 48.12	1.9366	14 19 21.9	11.010
21	7 29 47.21	2.0687	21 33 45.3	7.207	21	9 5 44.25	1.9343	14 8 19.4	11.073
22	7 31 51.24	2.0657	21 26 30.0	7.304	22	9 7 40.23	1.9319	13 57 13.1	11.136
23	7 33 55.10	2.0628	N. 21 19 8.8	7.401	23	9 9 36.08	1.9297	N. 13 46 3.1	11.197
MONDAY 18.					WEDNESDAY 20.				
0	7 35 58.78	2.0599	N. 21 11 41.9	7.497	0	9 11 31.80	1.9275	N. 13 34 49.5	11.259
1	7 38 2.29	2.0570	21 4 9.2	7.592	1	9 13 27.38	1.9253	13 23 32.2	11.317
2	7 40 5.62	2.0540	20 56 30.9	7.686	2	9 15 22.84	1.9232	13 12 11.4	11.377
3	7 42 8.77	2.0510	20 48 46.9	7.780	3	9 17 18.16	1.9210	13 0 47.0	11.436
4	7 44 11.74	2.0481	20 40 57.3	7.873	4	9 19 13.36	1.9190	12 49 19.1	11.493
5	7 46 14.54	2.0452	20 33 2.1	7.966	5	9 21 8.44	1.9170	12 37 47.8	11.550
6	7 48 17.16	2.0421	20 25 1.4	8.057	6	9 23 3.40	1.9150	12 26 13.1	11.606
7	7 50 19.59	2.0391	20 16 55.2	8.148	7	9 24 58.24	1.9131	12 14 35.1	11.662
8	7 52 21.85	2.0362	20 8 43.6	8.238	8	9 26 52.97	1.9112	12 2 53.7	11.717
9	7 54 23.93	2.0332	20 0 26.6	8.328	9	9 28 47.59	1.9093	11 51 9.1	11.770
10	7 56 25.83	2.0302	19 52 4.2	8.418	10	9 30 42.09	1.9075	11 39 21.3	11.823
11	7 58 27.55	2.0272	19 43 36.4	8.507	11	9 32 36.49	1.9057	11 27 30.4	11.875
12	8 0 29.09	2.0242	19 35 3.4	8.593	12	9 34 30.78	1.9040	11 15 36.3	11.927
13	8 2 30.45	2.0212	19 26 25.2	8.681	13	9 36 24.97	1.9023	11 3 39.2	11.978
14	8 4 31.64	2.0183	19 17 41.7	8.768	14	9 38 19.06	1.9007	10 51 39.0	12.028
15	8 6 32.65	2.0153	19 8 53.1	8.853	15	9 40 13.06	1.8992	10 39 35.8	12.077
16	8 8 33.48	2.0123	18 59 59.4	8.937	16	9 42 6.96	1.8976	10 27 29.7	12.126
17	8 10 34.13	2.0093	18 51 0.7	9.021	17	9 44 0.77	1.8961	10 15 20.7	12.173
18	8 12 34.60	2.0064	18 41 56.9	9.104	18	9 45 54.49	1.8947	10 3 8.9	12.220
19	8 14 34.90	2.0035	18 32 48.2	9.187	19	9 47 48.13	1.8933	9 50 54.3	12.266
20	8 16 35.02	2.0006	18 23 34.5	9.269	20	9 49 41.68	1.8919	9 38 37.0	12.312
21	8 18 34.97	1.9977	18 14 15.9	9.350	21	9 51 35.16	1.8907	9 26 16.9	12.357
22	8 20 34.75	1.9948	18 4 52.5	9.430	22	9 53 28.56	1.8894	9 13 54.2	12.400
23	8 22 34.35	1.9919	17 55 24.3	9.510	23	9 55 21.89	1.8882	9 1 28.9	12.443
24	8 24 33.78	1.9891	N. 17 45 51.3	9.589	24	9 57 15.15	1.8871	N. 8 49 1.0	12.486

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 21.					SATURDAY 23.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	9 57 15.15	1.8871	N. 8 49 1.0	12.486	1	11 27 37.91	1.9030	S. 1 44 12.7	13.590
2	9 59 8.34	1.8860	8 36 30.6	12.527	2	11 29 32.15	1.9050	1 57 48.2	13.592
3	10 1 1.47	1.8850	8 23 57.7	12.568	3	11 31 26.51	1.9071	2 11 23.8	13.594
4	10 2 54.54	1.8840	8 11 22.4	12.608	4	11 33 21.00	1.9092	2 24 59.5	13.596
5	10 4 47.55	1.8831	7 58 44.7	12.647	5	11 35 15.62	1.9114	2 38 35.3	13.597
6	10 6 40.51	1.8823	7 46 4.7	12.686	6	11 37 10.37	1.9136	2 52 11.1	13.596
7	10 8 33.42	1.8815	7 33 22.4	12.724	7	11 39 5.25	1.9159	3 5 46.8	13.593
8	10 10 26.29	1.8807	7 20 37.8	12.761	8	11 41 0.28	1.9183	3 19 22.3	13.591
9	10 12 19.11	1.8800	7 7 51.1	12.797	9	11 42 55.45	1.9208	3 32 57.7	13.587
10	10 14 11.89	1.8793	6 55 2.2	12.832	10	11 44 50.78	1.9234	3 46 32.8	13.583
11	10 16 4.63	1.8787	6 42 11.2	12.867	11	11 46 46.26	1.9259	4 0 7.7	13.578
12	10 17 57.34	1.8782	6 29 18.2	12.901	12	11 48 41.89	1.9286	4 13 42.2	13.572
13	10 19 50.01	1.8777	6 16 23.1	12.934	13	11 50 37.69	1.9314	4 27 16.3	13.565
14	10 21 42.66	1.8773	6 3 26.1	12.966	14	11 52 33.66	1.9343	4 40 50.0	13.557
15	10 23 35.29	1.8770	5 50 27.2	12.997	15	11 54 29.81	1.9372	4 54 23.1	13.547
16	10 25 27.90	1.8767	5 37 26.4	13.028	16	11 56 26.13	1.9402	5 7 55.7	13.537
17	10 27 20.49	1.8764	5 24 23.8	13.058	17	11 58 22.63	1.9432	5 21 27.6	13.526
18	10 29 13.07	1.8762	5 11 19.4	13.087	18	12 0 19.32	1.9464	5 34 58.8	13.514
19	10 31 5.64	1.8762	4 58 13.3	13.116	19	12 2 16.20	1.9496	5 48 29.3	13.502
20	10 32 58.21	1.8762	4 45 5.5	13.143	20	12 4 13.27	1.9528	6 1 59.0	13.488
21	10 34 50.78	1.8762	4 31 56.1	13.170	21	12 6 10.54	1.9562	6 15 27.9	13.473
22	10 36 43.35	1.8762	4 18 45.1	13.196	22	12 8 8.02	1.9597	6 28 55.8	13.457
23	10 38 35.93	1.8763	4 5 32.6	13.221	23	12 10 5.71	1.9632	6 42 22.7	13.440
24	10 40 28.51	1.8765	N. 3 52 18.6	13.245	24	12 12 3.61	1.9668	S. 6 55 48.6	13.422
FRIDAY 22.					SUNDAY 24.				
0	10 42 21.11	1.8768	N. 3 39 3.2	13.268	0	12 14 1.73	1.9705	S. 7 9 13.4	13.403
1	10 44 13.73	1.8772	3 25 46.4	13.292	1	12 16 0.07	1.9743	7 22 37.0	13.383
2	10 46 6.37	1.8776	3 12 28.2	13.314	2	12 17 58.64	1.9781	7 35 59.4	13.363
3	10 47 59.04	1.8780	2 59 8.7	13.335	3	12 19 57.44	1.9819	7 49 20.6	13.342
4	10 49 51.73	1.8785	2 45 48.0	13.355	4	12 21 56.47	1.9858	8 2 40.4	13.318
5	10 51 44.46	1.8791	2 32 26.1	13.375	5	12 23 55.74	1.9899	8 15 58.8	13.294
6	10 53 37.22	1.8797	2 19 3.0	13.394	6	12 25 55.26	1.9941	8 29 15.7	13.268
7	10 55 30.03	1.8805	2 5 38.8	13.412	7	12 27 55.03	1.9983	8 42 31.0	13.242
8	10 57 22.88	1.8813	1 52 13.6	13.428	8	12 29 55.05	2.0025	8 55 44.8	13.216
9	10 59 15.78	1.8821	1 38 47.4	13.445	9	12 31 55.33	2.0069	9 8 56.9	13.187
10	11 1 8.73	1.8829	1 25 20.2	13.461	10	12 33 55.88	2.0113	9 22 7.2	13.157
11	11 3 1.73	1.8839	1 11 52.1	13.475	11	12 35 56.69	2.0158	9 35 15.7	13.127
12	11 4 54.80	1.8851	0 58 23.2	13.488	12	12 37 57.78	2.0204	9 48 22.4	13.095
13	11 6 47.94	1.8862	0 44 53.5	13.502	13	12 39 59.14	2.0250	10 1 27.1	13.062
14	11 8 41.14	1.8873	0 31 23.0	13.514	14	12 42 0.78	2.0297	10 14 29.8	13.028
15	11 10 34.42	1.8887	0 17 51.8	13.526	15	12 44 2.71	2.0345	10 27 30.5	12.993
16	11 12 27.78	1.8900	N. 0 4 19.9	13.537	16	12 46 4.92	2.0393	10 40 29.0	12.957
17	11 14 21.22	1.8913	S. 0 9 12.6	13.547	17	12 48 7.43	2.0443	10 53 25.3	12.919
18	11 16 14.74	1.8927	0 22 45.7	13.555	18	12 50 10.24	2.0491	11 6 19.3	12.881
19	11 18 8.35	1.8943	0 36 19.2	13.563	19	12 52 13.36	2.0545	11 19 11.0	12.841
20	11 20 2.06	1.8959	0 49 53.2	13.570	20	12 54 16.78	2.0596	11 32 0.2	12.800
21	11 21 55.86	1.8976	1 3 27.6	13.576	21	12 56 20.51	2.0648	11 44 47.0	12.758
22	11 23 49.77	1.8994	1 17 2.3	13.582	22	12 58 24.55	2.0701	11 57 31.2	12.715
23	11 25 43.79	1.9012	1 30 37.4	13.587	23	13 0 28.92	2.0755	12 10 12.8	12.670
24	11 27 37.91	1.9030	S. 1 44 12.7	13.590	24	13 2 33.61	2.0809	S. 12 22 51.6	12.623

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 25.					WEDNESDAY 27.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	13 2 33.61	2.0809	S. 12 22 51.6	12.623	0	14 49 50.85	2.4061	S. 21 9 55.9	8.765
1	13 4 38.63	2.0864	12 35 27.6	12.577	1	14 52 15.44	2.4135	21 18 38.3	8.647
2	13 6 43.98	2.0920	12 48 0.8	12.528	2	14 54 40.47	2.4209	21 27 13.5	8.527
3	13 8 49.67	2.0977	13 0 31.0	12.478	3	14 57 5.95	2.4284	21 35 41.5	8.405
4	13 10 55.70	2.1034	13 12 58.2	12.428	4	14 59 31.88	2.4358	21 44 2.1	8.282
5	13 13 2.08	2.1092	13 25 22.3	12.376	5	15 1 58.25	2.4432	21 52 15.3	8.157
6	13 15 8.80	2.1150	13 37 43.3	12.322	6	15 4 25.07	2.4507	22 0 20.9	8.029
7	13 17 15.88	2.1210	13 50 1.0	12.267	7	15 6 52.33	2.4580	22 8 18.8	7.901
8	13 19 23.34	2.1269	14 2 15.3	12.211	8	15 9 20.03	2.4653	22 16 9.0	7.772
9	13 21 31.11	2.1329	14 14 26.3	12.154	9	15 11 48.17	2.4727	22 23 51.4	7.640
10	13 23 39.27	2.1391	14 26 33.8	12.095	10	15 14 16.75	2.4799	22 31 25.8	7.507
11	13 25 47.80	2.1453	14 38 37.7	12.035	11	15 16 45.76	2.4871	22 38 52.2	7.372
12	13 27 56.70	2.1515	14 50 38.0	11.973	12	15 19 15.20	2.4942	22 46 10.4	7.235
13	13 30 5.98	2.1578	15 2 34.5	11.910	13	15 21 45.07	2.5014	22 53 20.4	7.097
14	13 32 15.64	2.1642	15 14 27.2	11.846	14	15 24 15.37	2.5086	23 0 22.1	6.957
15	13 34 25.68	2.1705	15 26 16.0	11.780	15	15 26 46.10	2.5157	23 7 15.3	6.816
16	13 36 36.10	2.1770	15 38 0.8	11.712	16	15 29 17.25	2.5227	23 14 0.0	6.673
17	13 38 46.92	2.1837	15 49 41.5	11.644	17	15 31 48.82	2.5296	23 20 36.1	6.529
18	13 40 58.14	2.1903	16 1 18.1	11.575	18	15 34 20.80	2.5364	23 27 3.5	6.383
19	13 43 9.75	2.1968	16 12 50.5	11.503	19	15 36 53.19	2.5432	23 33 22.1	6.236
20	13 45 21.76	2.2035	16 24 18.5	11.430	20	15 39 25.99	2.5501	23 39 31.8	6.087
21	13 47 34.17	2.2103	16 35 42.1	11.356	21	15 41 59.20	2.5567	23 45 32.5	5.936
22	13 49 46.99	2.2172	16 47 1.2	11.280	22	15 44 32.80	2.5633	23 51 24.1	5.783
23	13 52 0.23	2.2240	S. 16 58 15.7	11.202	23	15 47 6.79	2.5698	S. 23 57 6.5	5.630
TUESDAY 26.					THURSDAY 28.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	13 54 13.87	2.2308	S. 17 9 25.5	11.124	0	15 49 41.18	2.5763	S. 24 2 39.7	5.476
1	13 56 27.93	2.2377	17 20 30.6	11.044	1	15 52 15.95	2.5827	24 8 3.6	5.319
2	13 58 42.40	2.2447	17 31 30.8	10.962	2	15 54 51.10	2.5890	24 13 18.0	5.161
3	14 0 57.30	2.2518	17 42 26.0	10.878	3	15 57 26.63	2.5952	24 18 22.9	5.002
4	14 3 12.62	2.2589	17 53 16.2	10.794	4	16 0 2.52	2.6012	24 23 18.2	4.841
5	14 5 28.37	2.2660	18 4 1.3	10.707	5	16 2 38.77	2.6072	24 28 3.8	4.678
6	14 7 44.54	2.2732	18 14 41.1	10.619	6	16 5 15.38	2.6131	24 32 39.6	4.515
7	14 10 1.15	2.2804	18 25 15.6	10.530	7	16 7 52.34	2.6188	24 37 5.6	4.351
8	14 12 18.19	2.2876	18 35 44.7	10.439	8	16 10 29.64	2.6245	24 41 21.7	4.185
9	14 14 35.66	2.2948	18 46 8.3	10.347	9	16 13 7.28	2.6301	24 45 27.8	4.017
10	14 16 53.57	2.3022	18 56 26.3	10.253	10	16 15 45.25	2.6356	24 49 23.8	3.848
11	14 19 11.92	2.3094	19 6 38.5	10.156	11	16 18 23.55	2.6409	24 53 9.6	3.678
12	14 21 30.70	2.3167	19 16 45.0	10.059	12	16 21 2.16	2.6461	24 56 45.2	3.507
13	14 23 49.93	2.3242	19 26 45.6	9.960	13	16 23 41.08	2.6512	25 0 10.5	3.335
14	14 26 9.60	2.3315	19 36 40.2	9.859	14	16 26 20.30	2.6561	25 3 25.4	3.162
15	14 28 29.71	2.3389	19 46 28.7	9.757	15	16 28 59.81	2.6609	25 6 29.9	2.987
16	14 30 50.27	2.3464	19 56 11.1	9.654	16	16 31 39.61	2.6657	25 9 23.9	2.812
17	14 33 11.28	2.3538	20 5 47.2	9.548	17	16 34 19.69	2.6705	25 12 7.3	2.635
18	14 35 32.73	2.3612	20 15 16.9	9.442	18	16 37 0.03	2.6745	25 14 40.1	2.457
19	14 37 54.63	2.3687	20 24 40.2	9.333	19	16 39 40.63	2.6787	25 17 2.2	2.279
20	14 40 16.98	2.3762	20 33 56.9	9.222	20	16 42 21.48	2.6829	25 19 13.6	2.099
21	14 42 39.78	2.3837	20 43 6.9	9.110	21	16 45 2.58	2.6869	25 21 14.1	1.918
22	14 45 3.02	2.3911	20 52 10.1	8.997	22	16 47 43.91	2.6907	25 23 3.8	1.737
23	14 47 26.71	2.3986	21 1 6.5	8.882	23	16 50 25.47	2.6944	25 24 42.5	1.554
24	14 49 50.85	2.4061	S. 21 9 55.9	8.765	24	16 53 7.24	2.6979	S. 25 26 10.3	1.372



THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 29.					SUNDAY 31.				
0	16 53 7.24	2.6979	S. 25 26 10.3	1.372	0	19 3 27.36	2.6688	S. 22 56 14.4	7.501
1	16 55 49.22	2.7012	25 27 27.1	1.188	1	19 6 7.36	2.6645	22 48 39.3	7.669
2	16 58 31.39	2.7044	25 28 32.9	1.003	2	19 8 47.10	2.6600	22 40 54.1	7.837
3	17 1 13.75	2.7075	25 29 27.5	0.817	3	19 11 26.56	2.6553	22 32 58.9	8.002
4	17 3 56.20	2.7103	25 30 11.0	0.632	4	19 14 5.74	2.6507	22 24 53.9	8.165
5	17 6 38.99	2.7130	25 30 43.4	0.446	5	19 16 44.64	2.6458	22 16 39.1	8.327
6	17 9 21.85	2.7156	25 31 4.5	0.258	6	19 19 23.24	2.6408	22 8 14.6	8.488
7	17 12 4.86	2.7179	25 31 14.4	-0.072	7	19 22 1.54	2.6358	21 59 40.5	8.648
8	17 14 48.00	2.7201	25 31 13.1	+0.117	8	19 24 39.54	2.6307	21 50 56.8	8.806
9	17 17 31.27	2.7222	25 31 0.4	0.306	9	19 27 17.23	2.6256	21 42 3.8	8.962
10	17 20 14.66	2.7241	25 30 36.4	0.494	10	19 29 54.61	2.6203	21 33 1.4	9.117
11	17 22 58.16	2.7257	25 30 1.1	0.682	11	19 32 31.66	2.6148	21 23 49.7	9.270
12	17 25 41.75	2.7272	25 29 14.5	0.872	12	19 35 8.39	2.6093	21 14 29.0	9.421
13	17 28 25.43	2.7286	25 28 16.5	1.062	13	19 37 44.78	2.6038	21 4 59.2	9.571
14	17 31 9.18	2.7297	25 27 7.0	1.252	14	19 40 20.84	2.5982	20 55 20.5	9.718
15	17 33 52.99	2.7307	25 25 46.2	1.442	15	19 42 56.56	2.5925	20 45 33.0	9.864
16	17 36 36.86	2.7315	25 24 13.9	1.632	16	19 45 31.94	2.5867	20 35 36.8	10.009
17	17 39 20.77	2.7321	25 22 30.2	1.822	17	19 48 6.96	2.5808	20 25 31.9	10.158
18	17 42 4.71	2.7326	25 20 35.1	2.012	18	19 50 41.63	2.5749	20 15 18.6	10.303
19	17 44 48.68	2.7329	25 18 28.6	2.202	19	19 53 15.95	2.5690	20 4 56.8	10.452
20	17 47 32.66	2.7329	25 16 10.7	2.392	20	19 55 49.91	2.5630	19 54 26.8	10.598
21	17 50 16.63	2.7328	25 13 41.4	2.582	21	19 58 23.51	2.5569	19 43 48.6	10.743
22	17 53 0.60	2.7327	25 11 0.6	2.772	22	20 0 56.74	2.5507	19 33 2.4	10.887
23	17 55 44.55	2.7324	S. 25 8 8.5	2.962	23	20 3 29.60	2.5446	S. 19 22 8.2	10.969
SATURDAY 30.					MONDAY, AUGUST 1.				
0	17 58 28.46	2.7315	S. 25 5 5.0	3.152	0	20 6 2.09	2.5384	S. 19 11 6.1	11.098
1	18 1 12.33	2.7308	25 1 50.1	3.342					
2	18 3 56.16	2.7299	24 58 23.9	3.531					
3	18 6 39.92	2.7288	24 54 46.4	3.719					
4	18 9 23.61	2.7275	24 50 57.6	3.907					
5	18 12 7.22	2.7260	24 46 57.5	4.095					
6	18 14 50.73	2.7243	24 42 46.2	4.282					
7	18 17 34.14	2.7226	24 38 23.7	4.468					
8	18 20 17.44	2.7207	24 33 50.0	4.654					
9	18 23 0.62	2.7186	24 29 5.2	4.838					
10	18 25 43.67	2.7162	24 24 9.4	5.023					
11	18 28 26.57	2.7138	24 19 2.5	5.207					
12	18 31 9.32	2.7112	24 13 44.6	5.389					
13	18 33 51.91	2.7084	24 8 15.8	5.571					
14	18 36 34.33	2.7056	24 2 36.1	5.752					
15	18 39 16.58	2.7026	23 56 45.6	5.932					
16	18 41 58.64	2.6993	23 50 44.3	6.111					
17	18 44 40.50	2.6960	23 44 32.3	6.288					
18	18 47 22.16	2.6925	23 38 9.7	6.465					
19	18 50 3.60	2.6888	23 31 36.5	6.641					
20	18 52 44.82	2.6852	23 24 52.8	6.815					
21	18 55 25.82	2.6813	23 17 58.7	6.988					
22	18 58 6.58	2.6773	23 10 54.2	7.161					
23	19 0 47.10	2.6732	23 3 39.4	7.332					
24	19 3 27.36	2.6688	S. 22 56 14.4	7.501					

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
PHASES OF THE MOON.				
○	Full Moon	July 3	9 12.1	
☾	Last Quarter	10	4 42.8	
●	New Moon	18	7 47.2	
☾	First Quarter	26	1 39.9	
☾	Perigee	July 3	2.1	
☾	Apogee	16	6.0	
☾	Perigee	31	10.6	

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	JUPITER W.	63 54 57	2128	65 45 14	2115	67 35 50	2103	69 26 44	2092
	Spica W.	43 24 9	2080	45 15 39	2068	47 7 28	2056	48 59 35	2045
	α Aquilæ E.	61 37 1	2108	60 2 44	2125	58 28 49	2146	56 55 21	2171
	Fomalhaut E.	85 32 11	2489	83 50 43	2482	82 9 4	2475	80 27 15	2470
	α Pegasi E.	106 27 38	2220	104 39 41	2206	102 51 23	2193	101 2 45	2181
2	JUPITER W.	78 45 3	2049	80 37 21	2043	82 29 48	2037	84 22 24	2033
	Spica W.	58 24 0	2002	60 17 31	1995	62 11 13	1990	64 5 3	1985
	Fomalhaut E.	71 57 3	2467	70 15 4	2473	68 33 13	2480	66 51 32	2491
	α Pegasi E.	91 55 33	2136	90 5 28	2130	88 15 14	2124	86 24 52	2120
3	Spica W.	73 35 46	1972	75 30 4	1972	77 24 22	1974	79 18 38	1975
	SATURN W.	29 29 32	2024	31 22 29	2016	33 15 38	2010	35 8 56	2007
	Antares W.	27 52 43	1969	29 47 6	1968	31 41 30	1969	33 35 53	1971
	Fomalhaut E.	58 27 48	2580	56 48 26	2507	55 9 41	2539	53 31 39	2575
	α Pegasi E.	77 12 4	2117	75 21 31	2120	73 31 2	2124	71 40 39	2129
4	Spica W.	88 48 56	1995	90 42 38	2001	92 36 10	2009	94 29 31	2016
	SATURN W.	44 36 3	2010	46 29 22	2014	48 22 34	2019	50 15 38	2025
	Antares W.	43 6 47	1990	45 0 37	1996	46 54 17	2003	48 47 46	2011
	α Pegasi E.	62 31 22	2174	60 42 16	2188	58 53 31	2203	57 5 8	2220
	α Arietis E.	104 43 17	2005	102 49 50	2012	100 56 34	2019	99 3 29	2026
5	SATURN W.	59 38 10	2068	61 29 58	2080	63 21 28	2092	65 12 40	2103
	Antares W.	58 11 48	2060	60 3 49	2072	61 55 31	2085	63 46 54	2097
	α Pegasi E.	48 10 17	2331	46 25 3	2361	44 40 32	2393	42 56 47	2429
	α Arietis E.	89 41 22	2075	87 49 44	2087	85 58 25	2099	84 7 25	2113
	MARS E.	104 12 17	2291	102 26 4	2303	100 40 9	2315	98 54 32	2329
6	SATURN W.	74 23 43	2174	76 12 50	2189	78 1 34	2205	79 49 54	2222
	Antares W.	72 58 38	2170	74 47 51	2185	76 36 41	2202	78 25 6	2218
	α Arietis E.	74 57 41	2186	73 8 53	2202	71 20 29	2219	69 32 30	2236
	MARS E.	90 11 36	2404	88 28 7	2421	86 45 2	2438	85 2 21	2455
7	SATURN W.	88 45 18	2309	90 31 5	2326	92 16 26	2345	94 1 20	2363
	Antares W.	87 20 52	2306	89 6 43	2324	90 52 8	2342	92 37 6	2360
	α Aquilæ W.	41 45 35	3748	43 1 31	3673	44 18 47	3608	45 37 13	3552
	α Arietis E.	60 39 2	2326	58 53 40	2346	57 8 47	2364	55 24 21	2384
	MARS E.	76 35 14	2548	74 55 7	2566	73 15 26	2586	71 36 12	2605
	Aldebaran E.	93 21 1	2356	91 36 23	2375	89 52 12	2393	88 8 27	2411
8	α Aquilæ W.	52 22 10	3373	53 44 57	3351	55 8 9	3334	56 31 41	3321
	α Arietis E.	46 49 15	2484	45 7 39	2504	43 26 31	2525	41 45 52	2546
	MARS E.	63 26 44	2705	61 50 11	2725	60 14 5	2746	58 38 26	2766
	Aldebaran E.	79 36 20	2506	77 55 15	2525	76 14 37	2545	74 34 26	2564
	SUN E.	116 52 51	2766	115 17 38	2785	113 42 51	2806	112 8 31	2825
9	α Aquilæ W.	63 32 19	3288	64 56 44	3288	66 21 10	3288	67 45 35	3290
	Fomalhaut W.	39 40 50	3784	40 56 9	3724	42 12 31	3673	43 29 47	3629
	MARS E.	50 46 44	2866	49 13 41	2886	47 41 4	2905	46 8 52	2925
	Aldebaran E.	66 20 11	2661	64 42 39	2681	63 5 33	2700	61 28 53	2719
	SUN E.	104 23 10	2924	102 51 21	2942	101 19 55	2961	99 48 53	2979

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	JUPITER W.	71 17 55	2083	73 9 21	2073	75 1 2	2064	76 52 56	2056
	Spica W.	50 51 59	2035	52 44 38	2026	54 37 32	2017	56 30 40	2009
	α Aquilæ E.	55 22 25	2001	53 50 7	2033	52 18 33	2073	50 47 49	2022
	Fomalhaut E.	78 45 19	2465	77 3 17	2463	75 21 12	2468	73 39 6	2465
	α Pegasi E.	99 13 49	2170	97 24 37	2160	95 35 9	2151	93 45 27	2143
2	JUPITER W.	86 15 7	2028	88 7 57	2026	90 0 51	2023	91 53 49	2023
	Spica W.	65 59 1	1981	67 53 5	1977	69 47 15	1973	71 41 29	1973
	Fomalhaut E.	65 10 6	2503	63 28 57	2517	61 48 8	2535	60 7 44	2556
	α Pegasi E.	84 34 24	2117	82 43 51	2116	80 53 16	2115	79 2 40	2115
3	Spica W.	81 12 52	1977	83 7 2	1981	85 1 7	1985	86 55 5	1989
	SATURN W.	37 2 19	2005	38 55 45	2004	40 49 13	2005	42 42 39	2007
	Antares W.	35 30 13	1973	37 24 30	1976	39 18 42	1980	41 12 48	1984
	Fomalhaut E.	51 54 25	2715	50 18 5	2762	48 42 47	2813	47 8 36	2871
	α Pegasi E.	69 50 24	2136	68 0 19	2143	66 10 25	2153	64 20 46	2165
4	Spica W.	96 22 40	2025	98 15 35	2034	100 8 16	2044	102 0 41	2055
	SATURN W.	52 8 33	2032	54 1 17	2040	55 53 49	2049	57 46 7	2059
	Antares W.	50 41 3	2019	52 34 7	2029	54 26 56	2039	56 19 30	2049
	α Pegasi E.	55 17 10	2238	53 29 39	2258	51 42 38	2281	49 56 10	2304
	α Arietis E.	97 10 35	2034	95 17 54	2044	93 25 28	2053	91 33 17	2064
5	SATURN W.	67 3 34	2116	68 54 8	2130	70 44 21	2144	72 34 13	2159
	Antares W.	65 37 58	2111	67 28 41	2125	69 19 2	2139	71 9 1	2154
	α Pegasi E.	41 13 53	2467	39 31 54	2510	37 50 55	2558	36 11 2	2612
	α Arietis E.	82 16 45	2126	80 26 26	2140	78 36 28	2155	76 46 53	2170
	MARS E.	97 9 15	2343	95 24 18	2357	93 39 42	2373	91 55 28	2388
6	SATURN W.	81 37 49	2238	83 25 20	2256	85 12 25	2272	86 59 5	2291
	Antares W.	80 13 6	2235	82 0 41	2252	83 47 51	2270	85 34 35	2288
	α Arietis E.	67 44 56	2253	65 57 48	2271	64 11 6	2289	62 24 51	2307
	MARS E.	83 20 5	2475	81 38 14	2491	79 56 48	2510	78 15 48	2528
7	SATURN W.	95 45 48	2322	97 29 49	2401	99 13 23	2479	100 56 30	2438
	Antares W.	94 21 38	2379	96 5 43	2398	97 49 21	2416	99 32 33	2435
	α Aquilæ W.	46 56 40	2304	48 17 0	2463	49 38 6	2428	50 59 51	2398
	α Arietis E.	53 40 24	2403	51 56 54	2424	50 13 53	2443	48 31 20	2463
	MARS E.	69 57 24	2626	68 19 4	2645	66 41 10	2666	65 3 44	2685
	Aldebaran E.	86 25 8	2430	84 42 16	2448	82 59 50	2468	81 17 52	2487
8	α Aquilæ W.	57 55 28	2310	59 19 28	2300	60 43 39	2294	62 7 57	2291
	α Arietis E.	40 5 43	2567	38 26 3	2588	36 46 52	2610	35 8 11	2632
	MARS E.	57 3 13	2785	55 28 26	2806	53 54 6	2826	52 20 12	2846
	Aldebaran E.	72 54 42	2584	71 15 25	2603	69 36 34	2622	67 58 9	2642
	SUN E.	110 34 36	2845	109 1 7	2865	107 28 3	2884	105 55 24	2904
9	α Aquilæ W.	69 9 58	2294	70 34 17	2298	71 58 31	2303	73 22 39	2309
	Fomalhaut W.	44 47 50	2391	46 6 34	2359	47 25 53	2331	48 45 43	2307
	MARS E.	44 37 5	2945	43 5 43	2964	41 34 45	2983	40 4 11	3003
	Aldebaran E.	59 52 38	2738	58 16 49	2757	56 41 25	2776	55 6 26	2796
	SUN E.	98 18 14	2997	96 47 58	3016	95 18 5	3033	93 48 33	3051

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	$\alpha$ Aquilæ W.	74 46 40	3316	76 10 33	3324	77 34 17	3332	78 57 52	3340
	Fomalhaut W.	50 5 59	3487	51 26 38	3469	52 47 37	3454	54 8 52	3442
	MARS E.	38 34 2	3022	37 4 16	3042	35 34 55	3060	34 5 57	3081
	Aldebaran E.	53 31 53	2815	51 57 45	2834	50 24 1	2853	48 50 42	2873
	SUN E.	92 19 23	3068	90 50 34	3084	89 22 5	3101	87 53 57	3117
11	$\alpha$ Aquilæ W.	85 53 4	3394	87 15 30	3402	88 37 44	3415	89 59 44	3426
	Fomalhaut W.	60 57 53	3408	62 20 1	3404	63 42 13	3402	65 4 27	3400
	$\alpha$ Pegasi W.	38 14 0	3230	39 39 34	3218	41 5 22	3209	42 31 21	3202
	Aldebaran E.	41 10 23	2973	39 39 36	2994	38 9 16	3016	36 39 23	3038
	SUN E.	80 37 58	3192	79 11 39	3206	77 45 37	3220	76 19 51	3232
12	Fomalhaut W.	71 55 41	3405	73 17 52	3408	74 40 0	3410	76 2 5	3414
	$\alpha$ Pegasi W.	49 42 49	3185	51 9 16	3185	52 35 43	3184	54 2 11	3185
	SUN E.	69 14 40	3291	67 50 18	3302	66 26 9	3312	65 2 11	3322
13	Fomalhaut W.	82 51 32	3432	84 13 12	3436	85 34 48	3441	86 56 18	3446
	$\alpha$ Pegasi W.	61 14 15	3192	62 40 34	3193	64 6 52	3195	65 33 7	3196
	SUN E.	58 5 1	3364	56 42 3	3372	55 19 14	3378	53 56 32	3385
14	Fomalhaut W.	93 42 26	3471	95 3 22	3478	96 24 11	3484	97 44 53	3490
	$\alpha$ Pegasi W.	72 43 54	3205	74 9 57	3206	75 35 59	3209	77 1 58	3209
	$\alpha$ Arietis W.	29 15 45	3114	30 43 37	3113	32 11 31	3112	33 39 26	3110
	SUN E.	47 4 46	3411	45 42 42	3415	44 20 43	3419	42 58 48	3423
15	$\alpha$ Pegasi W.	84 11 32	3215	85 37 23	3216	87 3 13	3217	88 29 2	3217
	$\alpha$ Arietis W.	40 59 17	3108	42 27 17	3107	43 55 18	3106	45 23 20	3106
	SUN E.	36 10 6	3435	34 48 29	3438	33 26 55	3438	32 5 22	3440
16	$\alpha$ Pegasi W.	95 37 57	3220	97 3 42	3220	98 29 27	3220	99 55 12	3221
	$\alpha$ Arietis W.	52 43 43	3101	54 11 52	3099	55 40 3	3097	57 8 16	3096
	MARS W.	30 33 45	3397	31 56 5	3393	33 18 30	3387	34 41 1	3383
	SUN E.	25 17 51	3441	23 56 21	3441	22 34 51	3440	21 13 20	3440
20	SUN W.	18 37 56	3326	20 1 37	3319	21 25 26	3313	22 49 22	3306
	JUPITER E.	48 16 23	3068	46 47 34	3064	45 18 40	3060	43 49 42	3058
	Spica E.	66 10 28	2976	64 39 45	2970	63 8 55	2965	61 37 58	2958
21	SUN W.	29 51 11	3269	31 15 59	3261	32 40 56	3253	34 6 3	3244
	Spica E.	54 1 16	2937	52 29 31	2920	50 57 38	2913	49 25 36	2906
	SATURN E.	97 40 23	2924	96 8 35	2917	94 36 38	2910	93 4 32	2902
	Antares E.	99 40 6	2917	98 8 9	2910	96 36 3	2902	95 3 47	2895
22	SUN W.	41 14 9	3200	42 40 18	3191	44 6 38	3182	45 33 9	3172
	Spica E.	41 43 9	2869	40 10 11	2862	38 37 4	2855	37 3 47	2847
	SATURN E.	85 21 32	2862	83 48 25	2854	82 15 7	2845	80 41 38	2837
	Antares E.	87 20 0	2855	85 46 43	2846	84 13 15	2837	82 39 35	2828
23	SUN W.	52 48 47	3119	54 16 33	3109	55 44 32	3097	57 12 45	3086
	Regulus W.	25 21 50	2832	26 55 36	2816	28 29 43	2801	30 4 10	2785
	SATURN E.	72 51 19	2790	71 16 38	2781	69 41 45	2770	68 6 38	2760
	Antares E.	74 48 17	2780	73 13 23	2770	71 38 16	2760	70 2 55	2748

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	α Aquilæ W.	80 21 17	3350	81 44 31	3359	83 7 34	3370	84 30 25	3380
	Fomalhaut W.	55 30 21	3481	56 52 2	3423	58 13 52	3417	59 35 49	3411
	MARS E.	32 37 24	3101	31 9 15	3120	29 41 30	3141	28 14 10	3161
	Aldebaran E.	47 17 48	2922	45 45 19	2912	44 13 15	2931	42 41 36	2952
	SUN E.	86 26 8	3133	84 58 38	3148	83 31 27	3163	82 4 34	3178
11	α Aquilæ W.	91 21 31	3438	92 43 4	3451	94 4 23	3464	95 25 27	3478
	Fomalhaut W.	66 26 43	3400	67 48 59	3401	69 11 14	3402	70 33 28	3403
	α Pegasi W.	43 57 28	3196	45 23 42	3192	46 50 1	3188	48 16 24	3187
	Aldebaran E.	35 9 57	3061	33 41 0	3087	32 12 35	3114	30 44 43	3144
	SUN E.	74 54 20	3245	73 29 4	3257	72 4 2	3269	70 39 14	3281
12	Fomalhaut W.	77 24 6	3417	78 46 3	3420	80 7 57	3423	81 29 47	3428
	α Pegasi W.	55 28 38	3185	56 55 5	3187	58 21 30	3188	59 47 53	3189
	SUN E.	63 38 25	3331	62 14 49	3340	60 51 24	3348	59 28 8	3356
13	Fomalhaut W.	88 17 43	3451	89 39 2	3455	91 0 16	3461	92 21 24	3466
	α Pegasi W.	66 59 21	3198	68 25 33	3200	69 51 42	3202	71 17 49	3204
	SUN E.	52 33 58	3391	51 11 31	3396	49 49 10	3401	48 26 55	3407
14	Fomalhaut W.	99 5 28	3497	100 25 56	3503	101 46 17	3510	103 6 30	3518
	α Pegasi W.	78 27 56	3211	79 53 52	3212	81 19 47	3214	82 45 40	3214
	α Arietis W.	35 7 23	3110	36 35 21	3110	38 3 19	3109	39 31 18	3109
	SUN E.	41 36 57	3426	40 15 10	3429	38 53 26	3431	37 31 45	3433
15	α Pegasi W.	89 54 51	3219	91 20 38	3219	92 46 25	3220	94 12 11	3220
	α Arietis W.	46 51 22	3105	48 19 25	3104	49 47 30	3103	51 15 36	3102
	SUN E.	30 43 51	3440	29 22 20	3441	28 0 50	3441	26 39 20	3442
16	α Pegasi W.	101 20 56	3221	102 46 40	3222	104 12 23	3222	105 38 6	3223
	α Arietis W.	58 36 31	3093	60 4 49	3091	61 33 9	3089	63 1 32	3087
	MARS W.	36 3 37	3378	37 26 19	3374	38 49 5	3370	40 11 56	3365
	SUN E.	19 51 49	3439	18 30 17	3438	17 8 44	3437	15 47 9	3435
20	SUN W.	24 13 27	3299	25 37 40	3291	27 2 2	3284	28 26 32	3276
	JUPITER E.	42 20 41	3055	40 51 36	3052	39 22 28	3050	37 53 17	3047
	Spica E.	60 6 53	2952	58 35 40	2946	57 4 20	2940	55 32 52	2934
21	SUN W.	35 31 20	3236	36 56 47	3227	38 22 24	3219	39 48 11	3209
	Spica E.	47 53 25	2899	46 21 5	2892	44 48 36	2884	43 15 57	2877
	SATURN E.	91 32 16	2894	89 59 50	2887	88 27 14	2879	86 54 28	2871
	Antares E.	93 31 22	2887	91 58 47	2880	90 26 2	2871	88 53 6	2863
22	SUN W.	46 59 52	3162	48 26 47	3152	49 53 54	3141	51 21 14	3130
	Spica E.	35 30 20	2839	33 56 43	2831	32 22 56	2824	30 48 59	2816
	SATURN E.	79 7 58	2828	77 34 6	2819	76 0 3	2809	74 25 47	2800
	Antares E.	81 5 44	2819	79 31 41	2810	77 57 26	2800	76 22 58	2790
23	SUN W.	58 41 12	3093	60 9 54	3082	61 38 50	3050	63 8 1	3037
	Regulus W.	31 38 57	2772	33 14 2	2758	34 49 25	2744	36 25 6	2731
	SATURN E.	66 31 18	2750	64 55 44	2740	63 19 57	2729	61 43 56	2718
	Antares E.	68 47 19	2738	66 51 29	2727	65 15 25	2716	63 39 6	2704

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Moon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
24	SUN W.	64 37 28	3084	66 7 11	3022	67 39 28	3028	69 7 24	2985
	Regulus W.	38 1 5	2727	39 37 22	2705	41 13 58	2702	42 50 52	2675
	VENUS W.	26 19 54	3196	27 46 8	3175	29 12 49	3138	30 38 55	3133
	SATURN E.	60 7 40	2707	58 31 10	2697	56 54 26	2686	55 17 20	2682
	Antares E.	62 2 31	2692	60 25 40	2681	58 48 34	2668	57 11 12	2662
25	SUN W.	76 42 53	2926	78 14 52	2902	79 47 9	2887	81 19 45	2872
	Regulus W.	51 0 1	2607	52 38 47	2592	54 17 53	2578	55 57 18	2564
	VENUS W.	38 1 15	3040	39 30 38	3022	41 0 24	3005	42 30 31	2986
	SATURN E.	47 8 41	2618	45 30 10	2606	43 51 23	2595	42 12 21	2584
	Antares E.	49 0 4	2592	47 20 58	2578	45 41 33	2565	44 1 50	2551
	$\alpha$ Aquilæ E.	102 19 40	3158	100 52 40	3138	99 25 16	3129	97 57 29	3100
26	SUN W.	89 7 34	2796	90 42 7	2786	92 17 1	2765	93 52 15	2749
	Regulus W.	64 19 24	2490	66 0 51	2476	67 42 38	2461	69 24 46	2445
	VENUS W.	50 6 38	2900	51 38 57	2885	53 11 38	2866	54 44 41	2848
	JUPITER W.	28 4 44	2645	29 42 38	2618	31 21 9	2592	33 0 13	2569
	Antares E.	35 38 27	2481	33 56 47	2467	32 14 48	2453	30 32 28	2438
	$\alpha$ Aquilæ E.	90 33 16	3020	89 3 28	3005	87 33 22	2993	86 3 0	2980
27	SUN W.	101 53 38	2670	103 30 58	2655	105 8 39	2639	106 46 41	2624
	Regulus W.	78 0 46	2371	79 45 2	2357	81 29 39	2342	83 14 37	2328
	VENUS W.	62 35 28	2765	64 10 44	2747	65 46 22	2730	67 22 22	2714
	JUPITER W.	41 23 6	2469	43 5 3	2450	44 47 27	2432	46 30 16	2414
	Spica W.	24 1 9	2401	25 44 43	2380	27 28 46	2362	29 13 16	2344
	$\alpha$ Aquilæ E.	78 27 37	2932	76 55 59	2925	75 24 12	2920	73 52 19	2916
	Fomalhaut E.	103 12 51	2805	101 38 27	2784	100 3 38	2764	98 28 23	2746
28	Regulus W.	92 4 44	2256	93 51 48	2243	95 39 12	2229	97 26 56	2216
	VENUS W.	75 27 44	2655	77 5 52	2619	78 44 21	2604	80 23 10	2590
	JUPITER W.	55 10 29	2332	56 55 42	2317	58 41 17	2302	60 27 14	2287
	Spica W.	38 1 53	2264	39 48 46	2249	41 36 1	2234	43 23 38	2220
	$\alpha$ Aquilæ E.	66 12 14	2920	64 40 20	2907	63 8 35	2895	61 37 1	2882
	Fomalhaut E.	90 26 23	2666	88 48 57	2653	87 11 14	2641	85 33 15	2629
29	VENUS W.	88 42 7	2522	90 22 50	2510	92 3 49	2498	93 45 5	2487
	JUPITER W.	69 22 7	2220	71 10 4	2209	72 58 18	2197	74 46 50	2186
	Spica W.	52 26 49	2155	54 16 25	2143	56 6 18	2132	57 56 28	2121
	$\alpha$ Aquilæ E.	54 4 15	3056	52 35 12	3022	51 6 53	3133	49 39 23	3179
	Fomalhaut E.	77 20 0	2591	75 40 53	2577	74 1 40	2565	72 22 24	2553
	$\alpha$ Pegasi E.	97 41 52	2289	95 55 37	2278	94 9 5	2266	92 22 16	2256
30	JUPITER W.	83 53 19	2140	85 43 17	2132	87 33 27	2126	89 23 47	2120
	Spica W.	67 11 12	2075	69 2 50	2068	70 54 39	2061	72 46 39	2054
	Fomalhaut E.	64 6 33	2607	62 27 48	2618	60 49 18	2632	59 11 7	2650
	$\alpha$ Pegasi E.	83 24 33	2213	81 36 25	2207	79 48 8	2202	77 59 43	2198
31	Spica W.	82 8 46	2052	84 1 30	2050	85 54 17	2028	87 47 7	2028
	SATURN W.	38 54 40	2066	40 46 31	2061	42 38 31	2057	44 30 37	2053
	Antares W.	36 26 10	2028	38 19 0	2026	40 11 54	2024	42 4 51	2023
	Fomalhaut E.	51 7 29	2789	49 32 47	2831	47 59 0	2879	46 26 14	2934
	$\alpha$ Pegasi E.	68 56 41	2195	67 8 3	2196	65 19 29	2200	63 31 1	2204

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
24	SUN W.	70 37 55	2972	72 8 43	2958	73 39 49	2944	75 11 12	2930
	Regulus W.	44 28 5	2662	46 5 36	2648	47 43 26	2635	49 21 34	2621
	VENUS W.	32 7 25	3113	33 35 19	3095	35 3 35	3076	36 32 14	3058
	SATURN E.	53 40 12	2663	52 2 42	2652	50 24 57	2640	48 46 57	2629
	Antares E.	55 33 32	2643	53 55 36	2631	52 17 23	2618	50 38 52	2605
25	SUN W.	82 52 40	2837	84 25 54	2822	85 59 28	2807	87 33 21	2811
	Regulus W.	57 37 3	2549	59 17 8	2535	60 57 33	2520	62 38 18	2505
	VENUS W.	44 1 1	2969	45 31 53	2952	47 3 6	2935	48 34 41	2917
	SATURN E.	40 33 4	2571	38 53 32	2563	37 13 46	2553	35 33 46	2543
	Antares E.	42 21 48	2538	40 41 27	2524	39 0 47	2510	37 19 47	2495
	α Aquilæ E.	96 29 19	3082	95 0 48	3066	93 31 57	3050	92 2 46	3034
26	SUN W.	95 27 50	2733	97 3 46	2718	98 40 2	2702	100 16 39	2686
	Regulus W.	71 7 16	2431	72 50 6	2416	74 33 18	2401	76 16 51	2386
	VENUS W.	56 18 6	2831	57 51 53	2815	59 26 2	2797	61 0 34	2780
	JUPITER W.	34 39 50	2548	36 19 56	2527	38 0 32	2507	39 41 35	2487
	Antares E.	28 49 48	2424	27 6 47	2410	25 23 27	2396	23 39 47	2382
	α Aquilæ E.	84 32 22	2969	83 1 30	2958	81 30 24	2948	79 59 6	2939
27	SUN W.	108 25 4	2608	110 3 48	2593	111 42 53	2577	113 22 19	2565
	Regulus W.	84 59 56	2313	86 45 36	2298	88 31 38	2284	90 18 1	2270
	VENUS W.	68 58 43	2698	70 35 26	2681	72 12 31	2666	73 49 57	2650
	JUPITER W.	48 13 31	2397	49 57 10	2380	51 41 13	2364	53 25 39	2348
	Spica W.	30 58 11	2327	32 43 31	2311	34 29 15	2294	36 15 23	2279
	α Aquilæ E.	72 20 20	2913	70 48 18	2912	69 16 15	2913	67 44 13	2916
	Fomalhaut E.	96 52 44	2728	95 16 41	2711	93 40 16	2695	92 3 30	2680
28	Regulus W.	99 14 59	2205	101 3 22	2191	102 52 3	2178	104 41 3	2167
	VENUS W.	82 2 19	2573	83 41 48	2561	85 21 36	2548	87 1 42	2535
	JUPITER W.	62 13 32	2273	64 0 11	2260	65 47 10	2246	67 34 29	2233
	Spica W.	45 11 36	2206	46 59 54	2192	48 48 33	2179	50 37 32	2167
	α Aquilæ E.	60 5 43	2962	58 34 43	2980	57 4 5	3001	55 33 54	3027
	Fomalhaut E.	83 55 0	2620	82 16 32	2610	80 37 51	2603	78 59 0	2596
29	VENUS W.	95 26 37	2476	97 8 24	2466	98 50 25	2456	100 32 40	2447
	JUPITER W.	76 35 38	2176	78 24 42	2167	80 14 0	2157	82 3 33	2148
	Spica W.	59 46 55	2111	61 37 38	2101	63 28 35	2092	65 19 47	2083
	α Aquilæ E.	48 12 49	3233	46 47 19	3226	45 23 3	3207	44 0 9	3190
	Fomalhaut E.	70 43 6	2585	69 3 50	2587	67 24 37	2591	65 45 30	2599
	α Pegasi E.	90 35 11	2245	88 47 51	2236	87 0 17	2228	85 12 31	2220
30	JUPITER W.	91 14 16	2114	93 4 54	2109	94 55 39	2105	96 46 31	2101
	Spica W.	74 38 49	2048	76 31 8	2044	78 23 34	2039	80 16 7	2035
	Fomalhaut E.	57 33 20	2670	55 56 0	2693	54 19 11	2721	52 42 59	2753
	α Pegasi E.	76 11 13	2195	74 22 38	2193	72 34 0	2192	70 45 20	2192
31	Spica W.	89 39 58	2028	91 32 49	2028	93 25 40	2029	95 18 29	2032
	SATURN W.	46 22 49	2051	48 15 4	2049	50 7 22	2049	51 59 40	2050
	Antares W.	43 57 50	2023	45 50 49	2023	47 43 47	2025	49 36 43	2026
	Fomalhaut E.	44 54 38	2997	43 24 21	3008	41 55 32	3150	40 28 23	3242
	α Pegasi E.	61 42 40	2211	59 54 29	2229	58 6 30	2229	56 18 45	2230

## AT GREENWICH APPARENT NOON.

Day of the Week	Day of the Month.	THE SUN'S						Sideral Time of Semi-diameter Passing Meridian	Equation of Time, to be Added to		Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.	Subtracted from Apparent Time.				
Mon.	1	h m s 8 46 34.38	9.700	N. 17 57 47.2	-37.95	15 48.09	66.61	m s 6 5.59	s 0.156		
Tues.	2	8 50 26.87	9.675	17 42 27.7	38.68	15 48.22	66.53	6 1.54	0.181		
Wed.	3	8 54 18.76	9.650	17 26 50.9	39.39	15 48.35	66.45	5 56.88	0.206		
Thur.	4	8 58 10.05	9.625	17 10 57.0	-40.09	15 48.49	66.37	5 51.64	0.231		
Frid.	5	9 2 0.74	9.600	16 54 46.4	40.79	15 48.62	66.28	5 45.79	0.256		
Sat.	6	9 5 50.85	9.576	16 38 19.3	41.47	15 48.76	66.19	5 39.36	0.280		
SUN.	7	9 9 40.38	9.552	16 21 36.0	-42.14	15 48.90	66.10	5 32.35	0.304		
Mon.	8	9 13 29.34	9.528	16 4 36.8	42.80	15 49.05	66.02	5 24.77	0.328		
Tues.	9	9 17 17.72	9.505	15 47 22.0	43.44	15 49.20	65.93	5 16.63	0.351		
Wed.	10	9 21 5.56	9.482	15 29 51.9	-44.07	15 49.36	65.85	5 7.92	0.374		
Thur.	11	9 24 52.83	9.459	15 12 6.8	44.69	15 49.52	65.77	4 58.68	0.397		
Frid.	12	9 28 39.56	9.436	14 54 6.9	45.29	15 49.68	65.69	4 48.88	0.420		
Sat.	13	9 32 25.75	9.413	14 35 52.8	-45.88	15 49.84	65.61	4 38.54	0.442		
SUN.	14	9 36 11.40	9.391	14 17 24.5	46.46	15 50.01	65.53	4 27.66	0.464		
Mon.	15	9 39 56.53	9.369	13 58 42.6	47.03	15 50.19	65.45	4 16.27	0.486		
Tues.	16	9 43 41.13	9.347	13 39 47.3	-47.58	15 50.37	65.38	4 4.35	0.508		
Wed.	17	9 47 25.22	9.326	13 20 39.0	48.11	15 50.55	65.30	3 51.92	0.529		
Thur.	18	9 51 8.80	9.305	13 1 17.9	48.63	15 50.74	65.23	3 38.97	0.550		
Frid.	19	9 54 51.88	9.285	12 41 44.5	-49.14	15 50.93	65.16	3 25.54	0.570		
Sat.	20	9 58 34.47	9.264	12 21 59.2	49.63	15 51.13	65.09	3 11.60	0.590		
SUN.	21	10 2 16.57	9.244	12 2 2.1	50.11	15 51.33	65.02	2 57.19	0.610		
Mon.	22	10 5 58.20	9.225	11 41 53.7	-50.58	15 51.54	64.95	2 42.30	0.630		
Tues.	23	10 9 39.37	9.206	11 21 34.2	51.03	15 51.75	64.89	2 26.96	0.649		
Wed.	24	10 13 20.08	9.188	11 1 4.2	51.47	15 51.96	64.83	2 11.17	0.667		
Thur.	25	10 17 0.37	9.170	10 40 23.7	-51.90	15 52.18	64.77	1 54.94	0.685		
Frid.	26	10 20 40.22	9.153	10 19 33.2	52.31	15 52.40	64.71	1 38.29	0.702		
Sat.	27	10 24 19.68	9.136	9 58 32.9	52.71	15 52.62	64.66	1 21.23	0.719		
SUN.	28	10 27 58.74	9.120	9 37 23.2	-53.10	15 52.84	64.61	1 3.80	0.735		
Mon.	29	10 31 37.44	9.105	9 16 4.4	53.47	15 53.06	64.56	0 45.99	0.750		
Tues.	30	10 35 15.78	9.091	8 54 36.8	53.83	15 53.29	64.51	0 27.82	0.764		
Wed.	31	10 38 53.79	9.077	8 33 0.6	54.18	15 53.52	64.46	0 9.34	0.777		
Thur.	32	10 42 31.49	9.065	N. 8 11 16.2	-54.52	15 53.75	64.41	0 9.48	0.789		

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sideral time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.



## AT GREENWICH MEAN NOON.

Day of the Week	Day of the Month	THE SUN'S				Equation of Time, to be Subtracted from	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Added to Mean Time.		
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Mon.	1	8 46 33.39	9.700	N. 17 57 51.0	-37.95	6 5.61	0.156	8 40 27.78
Tues.	2	8 50 25.90	9.675	17 42 31.5	38.67	6 1.56	0.181	8 44 24.34
Wed.	3	8 54 17.80	9.650	17 26 54.7	39.38	5 56.90	0.206	8 48 20.90
Thur.	4	8 58 9.11	9.625	17 11 0.9	-40.09	5 51.66	0.231	8 52 17.45
Frid.	5	9 1 59.82	9.601	16 54 50.3	40.79	5 45.81	0.256	8 56 14.01
Sat.	6	9 5 49.95	9.577	16 38 23.2	41.47	5 39.39	0.280	9 0 10.56
SUN.	7	9 9 39.50	9.553	16 21 39.9	-42.13	5 32.38	0.304	9 4 7.12
Mon.	8	9 13 28.48	9.529	16 4 40.6	42.79	5 24.80	0.328	9 8 3.68
Tues.	9	9 17 16.89	9.506	15 47 25.8	43.44	5 16.66	0.351	9 12 0.23
Wed.	10	9 21 4.74	9.483	15 29 55.6	-44.07	5 7.95	0.374	9 15 56.79
Thur.	11	9 24 52.05	9.460	15 12 10.4	44.69	4 58.71	0.397	9 19 53.34
Frid.	12	9 28 38.81	9.437	14 54 10.5	45.30	4 48.91	0.420	9 23 49.90
Sat.	13	9 32 25.02	9.415	14 35 56.2	-45.89	4 38.57	0.442	9 27 46.45
SUN.	14	9 36 10.70	9.393	14 17 27.9	46.47	4 27.69	0.464	9 31 43.01
Mon.	15	9 39 55.86	9.371	13 58 45.9	47.03	4 16.30	0.486	9 35 39.56
Tues.	16	9 43 40.50	9.349	13 39 50.5	-47.58	4 4.38	0.508	9 39 36.12
Wed.	17	9 47 24.62	9.328	13 20 42.0	48.12	3 51.95	0.529	9 43 32.67
Thur.	18	9 51 8.23	9.307	13 1 20.8	48.64	3 39.00	0.550	9 47 29.23
Frid.	19	9 54 51.35	9.286	12 41 47.3	-49.15	3 25.57	0.570	9 51 25.78
Sat.	20	9 58 33.97	9.266	12 22 1.7	49.64	3 11.63	0.590	9 55 22.34
SUN.	21	10 2 16.11	9.246	12 2 4.5	50.12	2 57.22	0.610	9 59 18.89
Mon.	22	10 5 57.78	9.227	11 41 55.9	-50.59	2 42.33	0.630	10 3 15.45
Tues.	23	10 9 38.99	9.208	11 21 36.2	51.04	2 26.99	0.649	10 7 12.00
Wed.	24	10 13 19.75	9.189	11 1 6.0	51.48	2 11.19	0.667	10 11 8.56
Thur.	25	10 17 0.07	9.171	10 40 25.3	-51.91	1 54.96	0.685	10 15 5.11
Frid.	26	10 20 39.97	9.154	10 19 34.5	52.32	1 38.31	0.702	10 19 1.66
Sat.	27	10 24 19.47	9.138	9 58 34.0	52.72	1 21.25	0.719	10 22 58.22
SUN.	28	10 27 58.58	9.122	9 37 24.1	-53.10	1 3.81	0.735	10 26 54.77
Mon.	29	10 31 37.32	9.107	9 16 5.1	53.47	0 46.00	0.750	10 30 51.32
Tues.	30	10 35 15.71	9.093	8 54 37.2	53.84	0 27.83	0.764	10 34 47.88
Wed.	31	10 38 53.77	9.079	8 33 0.7	54.19	0 9.34	0.777	10 38 44.43
Thur.	32	10 42 31.51	9.067	N. 8 11 16.0	-54.53	0 9.48	0.789	10 42 40.99

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing.

Diff. for 1 Hour,  
+ 9<sup>h</sup> 8 56<sup>s</sup>.  
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S					Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	213	129 12 24.4	11 37.4	143.52	+ 0.07	0.0063252	-24.5	h m s 15 17 1.57	
2	214	130 9 49.3	9 2.1	143.56	0.19	0.0062659	25.0	15 13 5.66	
3	215	131 7 15.2	6 27.9	143.60	0.31	0.0062054	25.5	15 9 9.75	
4	216	132 4 42.2	3 54.8	143.64	+ 0.40	0.0061437	-26.0	15 5 13.84	
5	217	133 2 10.3	1 22.7	143.69	0.47	0.0060807	26.5	15 1 17.93	
6	218	133 59 39.5	58 51.8	143.74	0.51	0.0060165	27.0	14 57 22.02	
7	219	134 57 10.0	56 22.1	143.80	+ 0.52	0.0059510	-27.6	14 53 26.11	
8	220	135 54 41.9	53 53.9	143.86	0.50	0.0058841	28.2	14 49 30.20	
9	221	136 52 15.1	51 27.0	143.92	0.45	0.0058156	28.9	14 45 34.29	
10	222	137 49 49.8	49 1.5	143.98	+ 0.38	0.0057453	-29.6	14 41 38.38	
11	223	138 47 25.9	46 37.5	144.04	0.28	0.0056734	30.4	14 37 42.47	
12	224	139 45 3.6	44 15.0	144.10	0.16	0.0055996	31.2	14 33 46.56	
13	225	140 42 42.6	41 53.9	144.16	+ 0.03	0.0055239	-32.0	14 29 50.65	
14	226	141 40 23.1	39 34.3	144.22	- 0.10	0.0054461	32.8	14 25 54.74	
15	227	142 38 5.1	37 16.1	144.28	0.23	0.0053663	33.7	14 21 58.84	
16	228	143 35 48.5	34 59.4	144.34	- 0.34	0.0052843	-34.6	14 18 2.93	
17	229	144 33 33.3	32 44.0	144.40	0.44	0.0052003	35.5	14 14 7.02	
18	230	145 31 19.3	30 29.9	144.45	0.53	0.0051139	36.4	14 10 11.11	
19	231	146 29 6.7	28 17.2	144.50	- 0.58	0.0050256	-37.2	14 6 15.20	
20	232	147 26 55.4	26 5.8	144.55	0.61	0.0049351	38.0	14 2 19.29	
21	233	148 24 45.3	23 55.5	144.61	0.61	0.0048429	38.8	13 58 23.38	
22	234	149 22 36.6	21 46.7	144.66	- 0.58	0.0047488	-39.5	13 54 27.47	
23	235	150 20 28.9	19 38.9	144.71	0.52	0.0046531	40.2	13 50 31.57	
24	236	151 18 22.5	17 32.4	144.76	0.43	0.0045558	40.8	13 46 35.66	
25	237	152 16 17.4	15 27.2	144.81	- 0.32	0.0044571	-41.3	13 42 39.75	
26	238	153 14 13.5	13 23.1	144.86	0.20	0.0043572	41.8	13 38 43.84	
27	239	154 12 10.9	11 20.4	144.92	- 0.07	0.0042563	42.2	13 34 47.93	
28	240	155 10 9.6	9 19.0	144.98	+ 0.06	0.0041545	-42.6	13 30 52.02	
29	241	156 8 9.8	7 19.1	145.04	0.19	0.0040519	43.0	13 26 56.12	
30	242	157 6 11.5	5 20.7	145.10	0.31	0.0039485	43.3	13 23 0.21	
31	243	158 4 14.7	3 23.8	145.17	0.40	0.0038446	43.5	13 19 4.30	
32	244	159 2 19.5	1 28.5	145.24	+ 0.47	0.0037401	-43.7	13 15 8.39	
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>h</sup> .									Diff. for 1 Hour, —9 <sup>m</sup> .8296. (Table II.)

GREENWICH MEAN TIME.

THE MOON'S

Day of the Month.									
	SEMIDIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	16 37.9	16 36.0	60 56.0	-0.42	60 48.8	-0.78	11 53.4	2.39	13.7
2	16 32.8	16 28.6	60 37.3	1.13	60 21.8	1.44	12 48.7	2.22	14.7
3	16 23.4	16 17.4	60 2.7	1.72	59 40.5	1.95	13 40.3	2.09	15.7
4	16 10.7	16 3.5	59 15.9	-2.12	58 49.6	-2.24	14 29.3	2.00	16.7
5	15 56.1	15 48.5	58 22.2	2.30	57 54.3	2.32	15 16.7	1.96	17.7
6	15 40.9	15 33.5	57 26.5	2.29	56 59.4	2.22	16 3.5	1.96	18.7
7	15 26.4	15 19.7	56 33.3	-2.11	56 8.8	-1.97	16 50.8	1.98	19.7
8	15 13.6	15 7.9	55 46.1	1.81	55 25.4	1.63	17 38.9	2.03	20.7
9	15 2.9	14 58.5	55 7.0	1.44	54 50.9	1.24	18 28.1	2.07	21.7
10	14 54.8	14 51.8	54 37.3	-1.03	54 26.1	-0.83	19 18.1	2.09	22.7
11	14 49.4	14 47.6	54 17.3	0.63	54 10.9	0.44	20 8.3	2.09	23.7
12	14 46.5	14 46.0	54 6.8	-0.25	54 4.9	-0.07	20 58.0	2.05	24.7
13	14 46.1	14 46.6	54 5.1	+0.10	54 7.2	+0.25	21 46.5	1.99	25.7
14	14 47.7	14 49.2	54 11.1	0.39	54 16.6	0.52	22 33.3	1.92	26.7
15	14 51.1	14 53.4	54 23.6	0.64	54 31.9	0.74	23 18.4	1.85	27.7
16	14 55.9	14 58.8	54 41.4	+0.83	54 51.9	+0.91	6		28.7
17	15 1.9	15 5.2	55 3.3	0.98	55 15.5	1.05	0 2.2	1.80	0.1
18	15 8.7	15 12.4	55 28.4	1.10	55 41.9	1.15	0 45.2	1.78	1.1
19	15 16.2	15 20.2	55 55.9	+1.19	56 10.4	+1.23	1 28.1	1.80	2.1
20	15 24.3	15 28.5	56 25.4	1.27	56 40.8	1.30	2 12.0	1.86	3.1
21	15 32.8	15 37.2	56 56.6	1.33	57 12.8	1.36	2 57.8	1.96	4.1
22	15 41.6	15 46.2	57 29.2	+1.38	57 46.0	+1.40	3 46.5	2.10	5.1
23	15 50.8	15 55.4	58 2.9	1.41	58 19.8	1.40	4 39.0	2.27	6.1
24	16 0.0	16 4.5	58 36.6	1.39	58 53.1	1.35	5 35.4	2.43	7.1
25	16 8.8	16 12.8	59 8.9	+1.28	59 23.8	+1.19	6 35.4	2.55	8.1
26	16 16.6	16 19.8	59 37.5	1.07	59 49.5	0.92	7 37.1	2.58	9.1
27	16 22.6	16 24.6	59 59.6	0.74	60 7.2	0.52	8 38.6	2.53	10.1
28	16 26.0	16 26.5	60 12.3	+0.29	60 14.1	+0.03	9 37.9	2.41	11.1
29	16 26.1	16 24.9	60 12.7	-0.25	60 8.0	-0.54	10 34.0	2.27	12.1
30	16 22.6	16 19.5	59 59.8	0.82	59 48.3	1.09	11 26.8	2.14	13.1
31	16 15.5	16 10.8	59 33.7	1.34	59 16.2	1.56	12 17.0	2.05	14.1
32	16 5.3	16 59.4	58 56.3	-1.75	58 34.3	-1.89	13 5.6	2.01	15.1

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 1.					WEDNESDAY 3.				
0	20 6 2.09	2.5384	S. 19 11 6.1	11.098	0	22 0 38.64	2.2463	S. 8 27 33.7	14.943
1	20 8 34.21	2.5322	18 59 56.4	11.225	1	22 2 53.27	2.2412	8 12 36.1	14.976
2	20 11 5.95	2.5258	18 48 39.1	11.351	2	22 5 7.59	2.2362	7 57 36.6	15.006
3	20 13 37.31	2.5196	18 37 14.3	11.474	3	22 7 21.61	2.2311	7 42 35.4	15.034
4	20 16 8.30	2.5132	18 25 42.2	11.596	4	22 9 35.34	2.2264	7 27 32.5	15.062
5	20 18 38.90	2.5068	18 14 2.8	11.716	5	22 11 48.78	2.2215	7 12 28.0	15.087
6	20 21 9.12	2.5005	18 2 16.3	11.833	6	22 14 1.92	2.2167	6 57 22.1	15.109
7	20 23 38.96	2.4942	17 50 22.8	11.948	7	22 16 14.78	2.2119	6 42 14.9	15.131
8	20 26 8.42	2.4877	17 38 22.5	12.062	8	22 18 27.35	2.2072	6 27 6.4	15.150
9	20 28 37.49	2.4812	17 26 15.4	12.174	9	22 20 39.65	2.2027	6 11 56.9	15.168
10	20 31 6.17	2.4748	17 14 1.6	12.283	10	22 22 51.67	2.1981	5 56 46.3	15.185
11	20 33 34.47	2.4684	17 1 41.4	12.390	11	22 25 3.42	2.1937	5 41 34.7	15.199
12	20 36 2.38	2.4619	16 49 14.8	12.496	12	22 27 14.91	2.1893	5 26 22.4	15.211
13	20 38 29.90	2.4555	16 36 41.9	12.599	13	22 29 26.14	2.1850	5 11 9.4	15.222
14	20 40 57.04	2.4491	16 24 2.9	12.701	14	22 31 37.11	2.1807	4 55 55.7	15.232
15	20 43 23.79	2.4426	16 11 17.8	12.800	15	22 33 47.83	2.1766	4 40 41.5	15.241
16	20 45 50.15	2.4362	15 58 26.9	12.897	16	22 35 58.30	2.1725	4 25 26.8	15.247
17	20 48 16.13	2.4297	15 45 30.2	12.993	17	22 38 8.53	2.1685	4 10 11.9	15.251
18	20 50 41.72	2.4233	15 32 27.8	13.086	18	22 40 18.52	2.1646	3 54 56.7	15.255
19	20 53 6.93	2.4169	15 19 19.9	13.177	19	22 42 28.28	2.1607	3 39 41.3	15.257
20	20 55 31.75	2.4105	15 6 6.6	13.266	20	22 44 37.80	2.1568	3 24 25.9	15.257
21	20 57 56.19	2.4042	14 52 48.0	13.352	21	22 46 47.09	2.1531	3 9 10.5	15.255
22	21 0 20.25	2.3978	14 39 24.3	13.437	22	22 48 56.17	2.1494	2 53 55.3	15.252
23	21 2 43.93	2.3915	S. 14 25 55.5	13.520	23	22 51 5.02	2.1457	S. 2 38 40.3	15.247
TUESDAY 2.					THURSDAY 4.				
0	21 5 7.23	2.3852	S. 14 12 21.9	13.601	0	22 53 13.65	2.1422	S. 2 23 25.6	15.241
1	21 7 30.15	2.3789	13 58 43.4	13.680	1	22 55 22.08	2.1388	2 8 11.4	15.233
2	21 9 52.70	2.3727	13 45 0.3	13.757	2	22 57 30.31	2.1354	1 52 57.6	15.224
3	21 12 14.87	2.3665	13 31 12.6	13.832	3	22 59 38.33	2.1321	1 37 44.5	15.213
4	21 14 36.68	2.3603	13 17 20.5	13.905	4	23 1 46.16	2.1288	1 22 32.0	15.202
5	21 16 58.11	2.3542	13 3 24.0	13.976	5	23 3 53.79	2.1257	1 7 20.3	15.188
6	21 19 19.18	2.3481	12 49 23.4	14.043	6	23 6 1.24	2.1227	0 52 9.5	15.173
7	21 21 39.88	2.3420	12 35 18.8	14.110	7	23 8 8.51	2.1196	0 36 59.5	15.157
8	21 24 0.22	2.3360	12 21 10.2	14.175	8	23 10 15.59	2.1166	0 21 50.6	15.139
9	21 26 20.20	2.3300	12 6 57.8	14.237	9	23 12 22.50	2.1137	S. 0 6 42.8	15.121
10	21 28 39.82	2.3241	11 52 41.7	14.298	10	23 14 29.24	2.1110	N. 0 8 23.9	15.101
11	21 30 59.09	2.3182	11 38 22.0	14.357	11	23 16 35.82	2.1082	0 23 29.3	15.079
12	21 33 18.00	2.3123	11 23 58.9	14.413	12	23 18 42.23	2.1056	0 38 33.4	15.056
13	21 35 36.57	2.3065	11 9 32.4	14.468	13	23 20 48.49	2.1030	0 53 36.0	15.031
14	21 37 54.78	2.3008	10 55 2.7	14.521	14	23 22 54.59	2.1005	1 8 37.1	15.006
15	21 40 12.66	2.2952	10 40 29.9	14.572	15	23 25 0.55	2.0981	1 23 36.7	14.979
16	21 42 30.20	2.2895	10 25 54.1	14.621	16	23 27 6.36	2.0957	1 38 34.6	14.951
17	21 44 47.40	2.2838	10 11 15.4	14.667	17	23 29 12.03	2.0934	1 53 30.8	14.922
18	21 47 4.26	2.2783	9 56 34.0	14.712	18	23 31 17.57	2.0912	2 8 25.2	14.891
19	21 49 20.80	2.2729	9 41 49.9	14.756	19	23 33 22.98	2.0891	2 23 17.7	14.859
20	21 51 37.01	2.2674	9 27 3.3	14.797	20	23 35 28.26	2.0869	2 38 8.3	14.826
21	21 53 52.89	2.2621	9 12 14.3	14.837	21	23 37 33.41	2.0848	2 52 56.8	14.791
22	21 56 8.46	2.2568	8 57 22.9	14.875	22	23 39 38.44	2.0829	3 7 43.2	14.756
23	21 58 23.71	2.2515	8 42 29.3	14.910	23	23 41 43.36	2.0811	3 22 27.5	14.719
24	22 0 38.64	2.2463	S. 8 27 33.7	14.943	24	23 43 48.17	2.0793	N. 3 37 9.5	14.681

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 5.					SUNDAY 7.				
0	23 43 48.17	2.0793	N. 3 37 9.5	14.681	0	1 22 43.82	2.0643	N. 14 18 46.4	11.704
1	23 45 52.88	2.0776	3 51 49.2	14.642	1	1 24 47.71	2.0652	14 30 26.2	11.622
2	23 47 57.48	2.0759	4 6 26.6	14.602	2	1 26 51.65	2.0662	14 42 1.1	11.540
3	23 50 1.99	2.0743	4 21 1.5	14.561	3	1 28 55.66	2.0673	14 53 31.0	11.456
4	23 52 6.40	2.0727	4 35 33.9	14.519	4	1 30 59.73	2.0683	15 4 55.8	11.371
5	23 54 10.72	2.0712	4 50 3.8	14.476	5	1 33 3.86	2.0694	15 16 15.5	11.286
6	23 56 14.95	2.0698	5 4 31.0	14.431	6	1 35 8.06	2.0705	15 27 30.1	11.200
7	23 58 19.10	2.0686	5 18 55.5	14.385	7	1 37 12.32	2.0716	15 38 39.5	11.113
8	0 0 23.18	2.0673	5 33 17.2	14.338	8	1 39 16.65	2.0728	15 49 43.7	11.026
9	0 2 27.18	2.0661	5 47 36.1	14.291	9	1 41 21.06	2.0741	16 0 42.6	10.938
10	0 4 31.11	2.0649	6 1 52.1	14.242	10	1 43 25.54	2.0753	16 11 36.3	10.850
11	0 6 34.97	2.0638	6 16 5.1	14.192	11	1 45 30.10	2.0766	16 22 24.6	10.760
12	0 8 38.77	2.0628	6 30 15.1	14.141	12	1 47 34.73	2.0778	16 33 7.5	10.671
13	0 10 42.51	2.0619	6 44 22.0	14.089	13	1 49 39.44	2.0792	16 43 45.1	10.581
14	0 12 46.20	2.0611	6 58 25.8	14.036	14	1 51 44.23	2.0806	16 54 17.2	10.489
15	0 14 49.84	2.0602	7 12 26.3	13.982	15	1 53 49.11	2.0820	17 4 43.8	10.397
16	0 16 53.43	2.0594	7 26 23.6	13.927	16	1 55 54.07	2.0834	17 15 4.9	10.305
17	0 18 56.97	2.0588	7 40 17.5	13.871	17	1 57 59.12	2.0848	17 25 20.4	10.212
18	0 21 0.48	2.0582	7 54 8.1	13.814	18	2 0 4.25	2.0862	17 35 30.3	10.118
19	0 23 3.95	2.0575	8 7 55.2	13.756	19	2 2 9.47	2.0878	17 45 34.6	10.025
20	0 25 7.38	2.0570	8 21 38.8	13.697	20	2 4 14.79	2.0893	17 55 33.3	9.931
21	0 27 10.79	2.0566	8 35 18.9	13.638	21	2 6 20.19	2.0907	18 5 26.3	9.835
22	0 29 14.17	2.0562	8 48 55.4	13.577	22	2 8 25.68	2.0923	18 15 13.5	9.738
23	0 31 17.53	2.0558	N. 9 2 28.2	13.515	23	2 10 31.27	2.0939	N. 18 24 54.9	9.642
SATURDAY 6.					MONDAY 8.				
0	0 33 20.87	2.0556	N. 9 15 57.2	13.453	0	2 12 36.95	2.0955	N. 18 34 30.5	9.545
1	0 35 24.20	2.0553	9 29 22.5	13.390	1	2 14 42.73	2.0971	18 44 0.3	9.447
2	0 37 27.51	2.0552	9 42 44.0	13.326	2	2 16 48.60	2.0987	18 53 24.2	9.349
3	0 39 30.82	2.0551	9 56 1.6	13.260	3	2 18 54.57	2.1003	19 2 42.2	9.251
4	0 41 34.12	2.0549	10 9 15.2	13.194	4	2 21 0.64	2.1020	19 11 54.3	9.152
5	0 43 37.41	2.0549	10 22 24.9	13.128	5	2 23 6.81	2.1037	19 21 0.4	9.052
6	0 45 40.71	2.0551	10 35 30.6	13.060	6	2 25 13.08	2.1053	19 30 0.5	8.951
7	0 47 44.02	2.0554	10 48 32.1	12.991	7	2 27 19.45	2.1070	19 38 54.5	8.850
8	0 49 47.33	2.0553	11 1 29.5	12.922	8	2 29 25.92	2.1087	19 47 42.5	8.748
9	0 51 50.66	2.0556	11 14 22.8	12.852	9	2 31 32.50	2.1104	19 56 24.3	8.646
10	0 53 54.00	2.0558	11 27 11.8	12.781	10	2 33 39.17	2.1121	20 5 0.0	8.544
11	0 55 57.35	2.0561	11 39 56.5	12.708	11	2 35 45.95	2.1138	20 13 29.6	8.441
12	0 58 0.73	2.0565	11 52 36.8	12.636	12	2 37 52.83	2.1155	20 21 52.9	8.337
13	1 0 4.13	2.0568	12 5 12.8	12.563	13	2 39 59.81	2.1172	20 30 10.0	8.233
14	1 2 7.55	2.0573	12 17 44.4	12.489	14	2 42 6.90	2.1190	20 38 20.9	8.128
15	1 4 11.00	2.0578	12 30 11.5	12.414	15	2 44 14.09	2.1207	20 46 25.4	8.023
16	1 6 14.49	2.0584	12 42 34.1	12.338	16	2 46 21.38	2.1223	20 54 23.6	7.918
17	1 8 18.01	2.0589	12 54 52.1	12.262	17	2 48 28.77	2.1241	21 2 15.5	7.812
18	1 10 21.56	2.0596	13 7 5.5	12.184	18	2 50 36.27	2.1258	21 10 1.0	7.705
19	1 12 25.16	2.0603	13 19 14.2	12.106	19	2 52 43.87	2.1275	21 17 40.1	7.598
20	1 14 28.80	2.0610	13 31 18.2	12.027	20	2 54 51.57	2.1292	21 25 12.8	7.491
21	1 16 32.48	2.0618	13 43 17.5	11.948	21	2 56 59.38	2.1310	21 32 39.0	7.383
22	1 18 36.21	2.0626	13 55 12.0	11.868	22	2 59 7.29	2.1327	21 39 58.7	7.274
23	1 20 39.99	2.0634	14 7 1.7	11.787	23	3 1 15.30	2.1344	21 47 11.9	7.165
24	1 22 43.82	2.0643	N. 14 18 46.4	11.704	24	3 3 23.42	2.1361	N. 21 54 18.5	7.056

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 9.					THURSDAY 11.				
0	3 3 23.42	2.1361	N.21 54 18.5	7.056	0	4 47 27.98	2.1880	N.25 20 31.6	1.437
1	3 5 31.63	2.1377	22 1 18.6	6.947	1	4 49 39.27	2.1882	25 21 54.2	1.316
2	3 7 39.95	2.1394	22 8 12.1	6.837	2	4 51 50.56	2.1882	25 23 9.5	1.194
3	3 9 48.36	2.1410	22 14 59.0	6.727	3	4 54 1.85	2.1882	25 24 17.5	1.072
4	3 11 56.87	2.1427	22 21 39.3	6.616	4	4 56 13.15	2.1883	25 25 18.2	0.951
5	3 14 5.48	2.1443	22 28 12.9	6.504	5	4 58 24.45	2.1882	25 26 11.6	0.829
6	3 16 14.19	2.1460	22 34 39.8	6.392	6	5 0 35.74	2.1881	25 26 57.7	0.708
7	3 18 23.00	2.1476	22 41 0.0	6.280	7	5 2 47.02	2.1879	25 27 36.6	0.587
8	3 20 31.90	2.1492	22 47 13.4	6.168	8	5 4 58.29	2.1877	25 28 8.1	0.464
9	3 22 40.90	2.1507	22 53 20.1	6.055	9	5 7 9.55	2.1875	25 28 32.3	0.342
10	3 24 49.99	2.1522	22 59 20.0	5.942	10	5 9 20.79	2.1872	25 28 49.2	0.222
11	3 26 59.17	2.1537	23 5 13.1	5.828	11	5 11 32.01	2.1868	25 28 58.9	+ 0.100
12	3 29 8.44	2.1552	23 10 59.4	5.714	12	5 13 43.21	2.1864	25 29 1.2	- 0.022
13	3 31 17.80	2.1567	23 16 38.8	5.600	13	5 15 54.38	2.1859	25 28 56.3	0.143
14	3 33 27.25	2.1582	23 22 11.4	5.486	14	5 18 5.52	2.1854	25 28 44.1	0.264
15	3 35 36.79	2.1597	23 27 37.1	5.370	15	5 20 16.63	2.1848	25 28 24.6	0.386
16	3 37 46.42	2.1612	23 32 55.8	5.254	16	5 22 27.70	2.1842	25 27 57.8	0.507
17	3 39 56.13	2.1625	23 38 7.6	5.139	17	5 24 38.74	2.1836	25 27 23.8	0.627
18	3 42 5.92	2.1638	23 43 12.5	5.023	18	5 26 49.73	2.1828	25 26 42.5	0.748
19	3 44 15.79	2.1652	23 48 10.4	4.907	19	5 29 0.68	2.1821	25 25 54.0	0.869
20	3 46 25.74	2.1665	23 53 1.4	4.791	20	5 31 11.58	2.1813	25 24 58.2	0.990
21	3 48 35.77	2.1678	23 57 45.3	4.673	21	5 33 22.43	2.1804	25 23 55.2	1.110
22	3 50 45.87	2.1690	24 2 22.2	4.556	22	5 35 33.23	2.1795	25 22 45.0	1.230
23	3 52 56.05	2.1702	N.24 6 52.0	4.438	23	5 37 43.97	2.1786	N.25 21 27.6	1.351
WEDNESDAY 10.					FRIDAY 12.				
0	3 55 6.29	2.1713	N.24 11 14.8	4.321	0	5 39 54.66	2.1776	N.25 20 2.9	1.471
1	3 57 16.61	2.1726	24 15 30.5	4.203	1	5 42 5.28	2.1765	25 18 31.1	1.590
2	3 59 27.00	2.1737	24 19 39.1	4.084	2	5 44 15.84	2.1754	25 16 52.1	1.709
3	4 1 37.45	2.1747	24 23 40.6	3.966	3	5 46 26.33	2.1742	25 15 6.0	1.828
4	4 3 47.97	2.1757	24 27 35.0	3.847	4	5 48 36.75	2.1730	25 13 12.7	1.947
5	4 5 58.54	2.1767	24 31 22.3	3.728	5	5 50 47.09	2.1717	25 11 12.3	2.066
6	4 8 9.18	2.1777	24 35 2.4	3.609	6	5 52 57.35	2.1704	25 9 4.8	2.185
7	4 10 19.87	2.1787	24 38 35.4	3.490	7	5 55 7.54	2.1692	25 6 50.1	2.304
8	4 12 30.62	2.1796	24 42 1.2	3.370	8	5 57 17.65	2.1678	25 4 28.3	2.424
9	4 14 41.42	2.1804	24 45 19.8	3.251	9	5 59 27.67	2.1663	25 1 59.5	2.539
10	4 16 52.27	2.1812	24 48 31.3	3.131	10	6 1 37.60	2.1648	24 59 23.6	2.657
11	4 19 3.17	2.1820	24 51 35.5	3.011	11	6 3 47.45	2.1633	24 56 40.7	2.773
12	4 21 14.11	2.1827	24 54 32.6	2.891	12	6 5 57.20	2.1617	24 53 50.8	2.890
13	4 23 25.10	2.1834	24 57 22.4	2.770	13	6 8 6.86	2.1601	24 50 53.9	3.007
14	4 25 36.12	2.1840	25 0 5.0	2.650	14	6 10 16.41	2.1584	24 47 50.0	3.123
15	4 27 47.18	2.1847	25 2 40.4	2.529	15	6 12 25.87	2.1567	24 44 39.1	3.240
16	4 29 58.28	2.1853	25 5 8.5	2.408	16	6 14 35.22	2.1550	24 41 21.2	3.355
17	4 32 9.41	2.1857	25 7 29.3	2.287	17	6 16 44.47	2.1532	24 37 56.5	3.470
18	4 34 20.57	2.1862	25 9 42.9	2.166	18	6 18 53.61	2.1514	24 34 24.8	3.586
19	4 36 31.76	2.1867	25 11 49.2	2.044	19	6 21 2.64	2.1495	24 30 46.2	3.700
20	4 38 42.07	2.1870	25 13 48.2	1.923	20	6 23 11.55	2.1476	24 27 0.8	3.813
21	4 40 54.20	2.1873	25 15 40.0	1.802	21	6 25 20.35	2.1457	24 23 8.6	3.928
22	4 43 5.45	2.1876	25 17 24.5	1.681	22	6 27 29.03	2.1437	24 19 9.5	4.042
23	4 45 16.71	2.1878	25 19 1.7	1.559	23	6 29 37.59	2.1417	24 15 3.6	4.154
24	4 47 27.98	2.1880	N.25 20 31.6	1.437	24	6 31 46.03	2.1396	N.24 10 51.0	4.267

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 13.					MONDAY 15.				
0	6 31 46.03	2.1396	N.24 10 51.0	4.267	0	8 11 37.83	2.0163	N.18 45 47.6	9.054
1	6 33 54.34	2.1375	24 6 31.6	4.379	1	8 13 38.73	2.0137	18 36 41.8	9.139
2	6 36 2.53	2.1354	24 2 5.5	4.491	2	8 15 39.47	2.0110	18 27 30.9	9.223
3	6 38 10.59	2.1333	23 57 32.7	4.602	3	8 17 40.05	2.0083	18 18 15.0	9.307
4	6 40 18.52	2.1311	23 52 53.3	4.713	4	8 19 40.46	2.0056	18 8 54.1	9.389
5	6 42 26.32	2.1288	23 48 7.2	4.823	5	8 21 40.72	2.0030	17 59 28.3	9.471
6	6 44 33.98	2.1266	23 43 14.5	4.933	6	8 23 40.82	2.0004	17 49 57.6	9.552
7	6 46 41.51	2.1243	23 38 15.2	5.043	7	8 25 40.77	1.9978	17 40 22.0	9.632
8	6 48 48.90	2.1219	23 33 9.3	5.152	8	8 27 40.56	1.9952	17 30 41.7	9.712
9	6 50 56.14	2.1196	23 27 56.9	5.261	9	8 29 40.19	1.9926	17 20 56.6	9.791
10	6 53 3.25	2.1173	23 22 38.0	5.368	10	8 31 39.67	1.9901	17 11 6.8	9.869
11	6 55 10.22	2.1149	23 17 12.7	5.477	11	8 33 39.00	1.9875	17 1 12.3	9.947
12	6 57 17.04	2.1125	23 11 40.8	5.584	12	8 35 38.17	1.9849	16 51 13.2	10.023
13	6 59 23.72	2.1100	23 6 2.6	5.690	13	8 37 37.19	1.9825	16 41 9.5	10.099
14	7 1 30.24	2.1075	23 0 18.0	5.796	14	8 39 36.07	1.9801	16 31 1.3	10.174
15	7 3 36.62	2.1051	22 54 27.1	5.902	15	8 41 34.80	1.9776	16 20 48.6	10.249
16	7 5 42.85	2.1026	22 48 29.8	6.007	16	8 43 33.38	1.9751	16 10 31.4	10.322
17	7 7 48.93	2.1000	22 42 26.2	6.112	17	8 45 31.81	1.9727	16 0 9.9	10.395
18	7 9 54.85	2.0974	22 36 16.4	6.215	18	8 47 30.10	1.9703	15 49 44.0	10.467
19	7 12 0.62	2.0948	22 30 0.4	6.318	19	8 49 28.25	1.9680	15 39 13.8	10.539
20	7 14 6.23	2.0922	22 23 38.2	6.422	20	8 51 26.26	1.9656	15 28 39.3	10.610
21	7 16 11.69	2.0897	22 17 9.8	6.524	21	8 53 24.12	1.9633	15 18 0.6	10.680
22	7 18 16.99	2.0871	22 10 35.3	6.626	22	8 55 21.85	1.9611	15 7 17.7	10.749
23	7 20 22.14	2.0844	N.22 3 54.7	6.727	23	8 57 19.45	1.9588	N.14 56 30.7	10.817
SUNDAY 14.					TUESDAY 16.				
0	7 22 27.12	2.0818	N.21 57 8.0	6.828	0	8 59 16.91	1.9566	N.14 45 39.6	10.885
1	7 24 31.95	2.0791	21 50 15.3	6.928	1	9 1 14.24	1.9544	14 34 44.5	10.952
2	7 26 36.61	2.0764	21 43 16.7	7.027	2	9 3 11.44	1.9522	14 23 45.4	11.018
3	7 28 41.12	2.0737	21 36 12.1	7.126	3	9 5 8.51	1.9501	14 12 42.3	11.084
4	7 30 45.46	2.0710	21 29 1.6	7.224	4	9 7 5.45	1.9480	14 1 35.3	11.148
5	7 32 49.64	2.0683	21 21 45.2	7.322	5	9 9 2.27	1.9460	13 50 24.5	11.212
6	7 34 53.65	2.0655	21 14 23.0	7.419	6	9 10 58.97	1.9439	13 39 9.8	11.276
7	7 36 57.50	2.0628	21 6 54.9	7.516	7	9 12 55.54	1.9419	13 27 51.4	11.338
8	7 39 1.19	2.0602	20 59 21.1	7.611	8	9 14 52.00	1.9400	13 16 29.2	11.400
9	7 41 4.72	2.0574	20 51 41.6	7.706	9	9 16 48.34	1.9380	13 5 3.4	11.460
10	7 43 8.08	2.0546	20 43 56.4	7.801	10	9 18 44.56	1.9361	12 53 34.0	11.520
11	7 45 11.27	2.0518	20 36 5.5	7.895	11	9 20 40.67	1.9343	12 42 1.0	11.580
12	7 47 14.30	2.0492	20 28 9.0	7.988	12	9 22 36.68	1.9326	12 30 24.4	11.638
13	7 49 17.17	2.0464	20 20 7.0	8.080	13	9 24 32.58	1.9308	12 18 44.4	11.696
14	7 51 19.87	2.0436	20 11 59.4	8.172	14	9 26 28.37	1.9290	12 7 0.9	11.752
15	7 53 22.40	2.0408	20 3 46.3	8.264	15	9 28 24.06	1.9273	11 55 14.1	11.808
16	7 55 24.77	2.0382	19 55 27.7	8.355	16	9 30 19.64	1.9256	11 43 23.9	11.864
17	7 57 26.98	2.0354	19 47 3.7	8.444	17	9 32 15.13	1.9240	11 31 30.4	11.919
18	7 59 29.02	2.0327	19 38 34.4	8.533	18	9 34 10.52	1.9224	11 19 33.6	11.972
19	8 1 30.90	2.0300	19 29 59.7	8.622	19	9 36 5.82	1.9209	11 7 33.7	12.024
20	8 3 32.62	2.0272	19 21 19.7	8.710	20	9 38 1.03	1.9194	10 55 30.7	12.077
21	8 5 34.17	2.0244	19 12 34.5	8.798	21	9 39 56.15	1.9180	10 43 24.5	12.128
22	8 7 35.55	2.0217	19 3 44.0	8.885	22	9 41 51.19	1.9166	10 31 15.3	12.179
23	8 9 36.77	2.0190	18 54 48.3	8.970	23	9 43 46.14	1.9152	10 19 3.0	12.228
24	8 11 37.83	2.0163	N.18 45 47.6	9.054	24	9 45 41.01	1.9138	N.10 6 47.9	12.277

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 17.					FRIDAY 19.				
0	9 45 41.01	1.9138	N. 10 6 47.9	12.277	0	11 16 59.41	1.9117	S. 0 22 59.8	13.632
1	9 47 35.80	1.9126	9 54 29.8	12.325	1	11 18 54.16	1.9132	0 36 38.0	13.639
2	9 49 30.52	1.9114	9 42 8.9	12.372	2	11 20 48.99	1.9147	0 50 16.5	13.644
3	9 51 25.17	1.9102	9 29 45.1	12.419	3	11 22 43.92	1.9162	1 3 55.3	13.649
4	9 53 19.75	1.9091	9 17 18.6	12.464	4	11 24 38.94	1.9177	1 17 34.4	13.653
5	9 55 14.26	1.9079	9 4 49.4	12.510	5	11 26 34.05	1.9193	1 31 13.7	13.656
6	9 57 8.70	1.9066	8 52 17.4	12.554	6	11 28 29.26	1.9210	1 44 53.1	13.657
7	9 59 3.09	1.9050	8 39 42.9	12.597	7	11 30 24.57	1.9228	1 58 32.6	13.658
8	10 0 57.42	1.9030	8 27 5.8	12.639	8	11 32 20.00	1.9247	2 12 12.1	13.658
9	10 2 51.69	1.9011	8 14 26.2	12.680	9	11 34 15.53	1.9265	2 25 51.6	13.657
10	10 4 45.91	1.9033	8 1 44.2	12.721	10	11 36 11.18	1.9285	2 39 31.0	13.655
11	10 6 40.08	1.9025	7 48 59.7	12.762	11	11 38 6.95	1.9305	2 53 10.2	13.652
12	10 8 34.21	1.9017	7 36 12.8	12.801	12	11 40 2.84	1.9326	3 6 49.2	13.648
13	10 10 28.29	1.9010	7 23 23.6	12.838	13	11 41 58.86	1.9348	3 20 28.0	13.643
14	10 12 22.33	1.9004	7 10 32.2	12.876	14	11 43 55.01	1.9370	3 34 6.4	13.637
15	10 14 16.34	1.8999	6 57 38.5	12.912	15	11 45 51.30	1.9393	3 47 44.4	13.630
16	10 16 10.32	1.8993	6 44 42.7	12.948	16	11 47 47.72	1.9416	4 1 22.0	13.622
17	10 18 4.26	1.8988	6 31 44.7	12.983	17	11 49 44.29	1.9440	4 14 59.1	13.614
18	10 19 58.17	1.8983	6 18 44.7	13.018	18	11 51 41.00	1.9465	4 28 35.7	13.604
19	10 21 52.06	1.8980	6 5 42.6	13.051	19	11 53 37.87	1.9491	4 42 11.6	13.592
20	10 23 45.93	1.8977	5 52 38.6	13.083	20	11 55 34.89	1.9517	4 55 46.8	13.580
21	10 25 39.78	1.8974	5 39 32.7	13.114	21	11 57 32.07	1.9543	5 9 21.2	13.567
22	10 27 33.62	1.8971	5 26 24.9	13.145	22	11 59 29.41	1.9571	5 22 54.9	13.554
23	10 29 27.45	1.8971	N. 5 13 15.3	13.174	23	12 1 26.92	1.9598	S. 5 36 27.7	13.538
THURSDAY 18.					SATURDAY 20.				
0	10 31 21.27	1.8970	N. 5 0 4.0	13.203	0	12 3 24.59	1.9627	S. 5 49 59.5	13.522
1	10 33 15.09	1.8969	4 46 51.0	13.232	1	12 5 22.44	1.9657	6 3 30.4	13.506
2	10 35 8.90	1.8968	4 33 36.2	13.259	2	12 7 20.47	1.9687	6 17 0.2	13.487
3	10 37 2.71	1.8969	4 20 19.9	13.284	3	12 9 18.68	1.9718	6 30 28.8	13.467
4	10 38 56.53	1.8971	4 7 2.1	13.310	4	12 11 17.08	1.9749	6 43 56.3	13.447
5	10 40 50.36	1.8972	3 53 42.7	13.335	5	12 13 15.67	1.9782	6 57 22.5	13.427
6	10 42 44.20	1.8974	3 40 21.9	13.358	6	12 15 14.46	1.9814	7 10 47.5	13.404
7	10 44 38.05	1.8977	3 26 59.7	13.382	7	12 17 13.44	1.9847	7 24 11.0	13.380
8	10 46 31.92	1.8981	3 13 36.1	13.403	8	12 19 12.62	1.9881	7 37 33.1	13.356
9	10 48 25.82	1.8985	3 0 11.3	13.424	9	12 21 12.01	1.9916	7 50 53.7	13.330
10	10 50 19.74	1.8990	2 46 45.2	13.445	10	12 23 11.61	1.9951	8 4 12.7	13.308
11	10 52 13.70	1.8995	2 33 17.9	13.464	11	12 25 11.42	1.9986	8 17 30.0	13.275
12	10 54 7.68	1.9000	2 19 49.5	13.482	12	12 27 11.44	2.0022	8 30 45.7	13.247
13	10 56 1.70	1.9007	2 6 20.0	13.500	13	12 29 11.69	2.0060	8 43 59.6	13.217
14	10 57 55.76	1.9014	1 52 49.5	13.517	14	12 31 12.16	2.0098	8 57 11.7	13.185
15	10 59 49.87	1.9022	1 39 18.0	13.534	15	12 33 12.86	2.0137	9 10 21.8	13.152
16	11 1 44.02	1.9030	1 25 45.6	13.547	16	12 35 13.80	2.0176	9 23 30.0	13.119
17	11 3 38.23	1.9039	1 12 12.4	13.561	17	12 37 14.97	2.0216	9 36 36.1	13.084
18	11 5 32.49	1.9048	0 58 38.3	13.574	18	12 39 16.39	2.0257	9 49 40.1	13.048
19	11 7 26.81	1.9058	0 45 3.5	13.586	19	12 41 18.05	2.0297	10 2 41.9	13.012
20	11 9 21.19	1.9069	0 31 28.0	13.597	20	12 43 19.95	2.0338	10 15 41.5	12.971
21	11 11 15.64	1.9081	0 17 51.9	13.607	21	12 45 22.11	2.0381	10 28 38.8	12.935
22	11 13 10.16	1.9092	N. 0 4 15.2	13.617	22	12 47 24.52	2.0424	10 41 33.7	12.895
23	11 15 4.75	1.9104	S. 0 9 22.1	13.625	23	12 49 27.20	2.0468	10 54 26.2	12.853
24	11 16 59.41	1.9117	S. 0 22 59.8	13.632	24	12 51 30.14	2.0512	S. 11 7 16.1	12.810



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 21.					TUESDAY 23.				
0	12 51 30.14	2.0512	S. 11 7 16.1	12.810	0	14 36 3.99	2.3215	S. 20 8 58.6	9.248
1	12 53 33.35	2.0557	11 20 3.4	12.766	1	14 38 23.47	2.3279	20 18 10.3	9.141
2	12 55 36.82	2.0602	11 32 48.0	12.721	2	14 40 43.34	2.3343	20 27 15.5	9.032
3	12 57 40.57	2.0648	11 45 29.9	12.675	3	14 43 3.59	2.3407	20 36 14.1	8.921
4	12 59 44.60	2.0695	11 58 9.0	12.627	4	14 45 24.22	2.3470	20 45 6.0	8.809
5	13 1 48.91	2.0742	12 10 45.2	12.578	5	14 47 45.23	2.3533	20 53 51.2	8.696
6	13 3 53.50	2.0790	12 23 18.4	12.528	6	14 50 6.62	2.3598	21 2 29.5	8.581
7	13 5 58.39	2.0838	12 35 48.6	12.477	7	14 52 28.40	2.3662	21 11 0.9	8.464
8	13 8 3.56	2.0887	12 48 15.7	12.425	8	14 54 50.56	2.3724	21 19 25.2	8.347
9	13 10 9.03	2.0937	13 0 39.6	12.372	9	14 57 13.09	2.3787	21 27 42.5	8.228
10	13 12 14.80	2.0987	13 13 0.3	12.317	10	14 59 36.01	2.3851	21 35 52.6	8.108
11	13 14 20.87	2.1038	13 25 17.6	12.261	11	15 1 59.30	2.3913	21 43 55.4	7.986
12	13 16 27.25	2.1089	13 37 31.6	12.203	12	15 4 22.97	2.3977	21 51 50.9	7.862
13	13 18 33.94	2.1141	13 49 42.0	12.144	13	15 6 47.02	2.4039	21 59 38.9	7.737
14	13 20 40.94	2.1193	14 1 48.9	12.084	14	15 9 11.44	2.4101	22 7 19.4	7.612
15	13 22 48.25	2.1245	14 13 52.1	12.023	15	15 11 36.23	2.4163	22 14 52.3	7.484
16	13 24 55.88	2.1298	14 25 51.7	11.961	16	15 14 1.40	2.4225	22 22 17.5	7.355
17	13 27 3.83	2.1352	14 37 47.4	11.897	17	15 16 26.93	2.4286	22 29 34.9	7.225
18	13 29 12.11	2.1407	14 49 39.3	11.832	18	15 18 52.83	2.4347	22 36 44.5	7.093
19	13 31 20.72	2.1462	15 1 27.3	11.766	19	15 21 19.10	2.4408	22 43 46.1	6.960
20	13 33 29.66	2.1517	15 13 11.2	11.698	20	15 23 45.73	2.4467	22 50 39.7	6.826
21	13 35 38.93	2.1573	15 24 51.0	11.628	21	15 26 12.71	2.4527	22 57 25.2	6.691
22	13 37 48.53	2.1629	15 36 26.6	11.558	22	15 28 40.05	2.4587	23 4 2.6	6.554
23	13 39 58.48	2.1687	S. 15 47 58.0	11.487	23	15 31 7.75	2.4646	S. 23 10 31.7	6.416
MONDAY 22.					WEDNESDAY 24.				
0	13 42 8.77	2.1743	S. 15 59 25.0	11.413	0	15 33 35.80	2.4704	S. 23 16 52.5	6.276
1	13 44 19.40	2.1801	16 10 47.6	11.339	1	15 36 4.20	2.4762	23 23 4.8	6.135
2	13 46 30.38	2.1859	16 22 5.7	11.264	2	15 38 32.94	2.4819	23 29 8.7	5.993
3	13 48 41.71	2.1917	16 33 19.3	11.187	3	15 41 2.03	2.4876	23 35 4.0	5.850
4	13 50 53.39	2.1977	16 44 28.2	11.108	4	15 43 31.45	2.4931	23 40 50.7	5.705
5	13 53 5.43	2.2037	16 55 32.3	11.028	5	15 46 1.20	2.4987	23 46 28.6	5.559
6	13 55 17.83	2.2096	17 6 31.6	10.947	6	15 48 31.29	2.5042	23 51 57.8	5.412
7	13 57 30.58	2.2155	17 17 26.0	10.865	7	15 51 1.70	2.5095	23 57 18.1	5.263
8	13 59 43.69	2.2216	17 28 15.4	10.781	8	15 53 32.43	2.5148	24 2 29.4	5.114
9	14 1 57.17	2.2277	17 38 59.7	10.696	9	15 56 3.48	2.5201	24 7 31.8	4.964
10	14 4 11.01	2.2337	17 49 38.9	10.609	10	15 58 34.84	2.5252	24 12 25.1	4.812
11	14 6 25.22	2.2399	18 0 12.8	10.521	11	16 1 6.51	2.5303	24 17 9.3	4.660
12	14 8 39.80	2.2461	18 10 41.4	10.432	12	16 3 38.48	2.5353	24 21 44.3	4.506
13	14 10 54.75	2.2522	18 21 4.6	10.341	13	16 6 10.75	2.5402	24 26 10.0	4.350
14	14 13 10.07	2.2584	18 31 22.3	10.248	14	16 8 43.31	2.5451	24 30 26.3	4.194
15	14 15 25.76	2.2647	18 41 34.4	10.155	15	16 11 16.16	2.5498	24 34 33.3	4.037
16	14 17 41.83	2.2710	18 51 40.9	10.060	16	16 13 49.29	2.5544	24 38 30.8	3.878
17	14 19 58.28	2.2772	19 1 41.6	9.963	17	16 16 22.69	2.5589	24 42 18.7	3.718
18	14 22 15.10	2.2835	19 11 36.5	9.866	18	16 18 56.36	2.5634	24 45 57.0	3.558
19	14 24 32.30	2.2898	19 21 25.5	9.766	19	16 21 30.30	2.5677	24 49 25.7	3.397
20	14 26 49.88	2.2961	19 31 8.4	9.665	20	16 24 4.49	2.5720	24 52 44.7	3.235
21	14 29 7.83	2.3024	19 40 45.3	9.563	21	16 26 38.94	2.5762	24 55 53.9	3.072
22	14 31 26.17	2.3088	19 50 16.0	9.460	22	16 29 13.63	2.5802	24 58 53.3	2.907
23	14 33 44.89	2.3152	19 59 40.5	9.355	23	16 31 48.56	2.5841	25 1 42.8	2.742
24	14 36 3.99	2.3215	S. 20 8 58.6	9.248	24	16 34 23.72	2.5879	S. 25 4 22.3	2.576

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 25.					SATURDAY 27.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	16 34 23.72	2.5879	S. 25 4 22.3	2.576	1	18 40 31.44	2.6152	S. 23 48 12.5	5.764
2	16 36 59.11	2.5916	25 6 51.9	2.409	2	18 43 8.27	2.6125	23 42 21.6	5.932
3	16 39 34.71	2.5951	25 9 11.4	2.242	3	18 45 44.94	2.6097	23 36 20.7	6.098
4	16 42 10.52	2.5986	25 11 20.9	2.074	4	18 48 21.44	2.6068	23 30 9.8	6.264
5	16 44 46.54	2.6019	25 13 20.3	1.905	5	18 50 57.76	2.6038	23 23 49.0	6.429
6	16 47 22.75	2.6051	25 15 9.5	1.735	6	18 53 33.90	2.6007	23 17 18.3	6.593
7	16 49 59.15	2.6082	25 16 48.5	1.564	7	18 56 9.85	2.5976	23 10 37.8	6.756
8	16 52 35.73	2.6112	25 18 17.2	1.393	8	18 58 45.61	2.5943	23 3 47.6	6.917
9	16 55 12.49	2.6140	25 19 35.7	1.222	9	19 1 21.16	2.5908	22 56 47.7	7.078
10	16 57 49.41	2.6167	25 20 43.8	1.049	10	19 3 56.51	2.5873	22 49 38.2	7.238
11	17 0 26.49	2.6193	25 21 41.6	0.877	11	19 6 31.64	2.5837	22 42 19.1	7.397
12	17 3 3.73	2.6217	25 22 29.0	0.703	12	19 9 6.55	2.5800	22 34 50.5	7.554
13	17 5 41.10	2.6240	25 23 6.0	0.530	13	19 11 41.24	2.5762	22 27 12.6	7.711
14	17 8 18.61	2.6262	25 23 32.6	0.356	14	19 14 15.69	2.5723	22 19 25.2	7.867
15	17 10 56.25	2.6282	25 23 48.7	0.181	15	19 16 49.91	2.5683	22 11 28.6	8.020
16	17 13 34.00	2.6301	25 23 54.3	-0.005	16	19 19 23.89	2.5643	22 3 22.8	8.173
17	17 16 11.86	2.6318	25 23 49.3	+0.170	17	19 21 57.63	2.5602	21 55 7.8	8.325
18	17 18 49.82	2.6335	25 23 33.9	0.345	18	19 24 31.12	2.5560	21 46 43.8	8.476
19	17 21 27.88	2.6350	25 23 7.9	0.522	19	19 27 4.35	2.5517	21 38 10.7	8.625
20	17 24 6.02	2.6363	25 22 31.3	0.698	20	19 29 37.32	2.5473	21 29 28.8	8.772
21	17 26 44.24	2.6376	25 21 44.1	0.875	21	19 32 10.03	2.5429	21 20 38.1	8.918
22	17 29 22.53	2.6386	25 20 46.3	1.052	22	19 34 42.47	2.5384	21 11 38.6	9.064
23	17 32 0.87	2.6395	25 19 37.9	1.228	23	19 37 14.64	2.5339	21 2 30.4	9.207
24	17 34 39.27	2.6404	S. 25 18 18.9	1.405	24	19 39 46.54	2.5293	S. 20 53 13.7	9.349
FRIDAY 26.					SUNDAY 28.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
1	17 37 17.72	2.6411	S. 25 16 49.3	1.582	1	19 42 18.16	2.5247	S. 20 43 48.5	9.490
2	17 39 56.20	2.6415	25 15 9.0	1.760	2	19 44 49.50	2.5199	20 34 14.9	9.639
3	17 42 34.70	2.6418	25 13 18.1	1.937	3	19 47 20.55	2.5152	20 24 33.0	9.787
4	17 45 13.22	2.6421	25 11 16.6	2.113	4	19 49 51.32	2.5105	20 14 42.8	9.934
5	17 47 51.75	2.6421	25 9 4.5	2.291	5	19 52 21.79	2.5054	20 4 44.5	10.081
6	17 50 30.27	2.6420	25 6 41.7	2.468	6	19 54 51.97	2.5006	19 54 38.2	10.228
7	17 53 8.79	2.6419	25 4 8.3	2.645	7	19 57 21.86	2.4956	19 44 23.9	10.375
8	17 55 47.30	2.6416	25 1 24.3	2.822	8	19 59 51.44	2.4906	19 34 1.8	10.522
9	17 58 25.78	2.6410	24 58 29.7	2.998	9	20 2 20.73	2.4856	19 23 31.9	10.669
10	18 1 4.22	2.6404	24 55 24.5	3.175	10	20 4 49.71	2.4805	19 12 54.4	10.816
11	18 3 42.63	2.6397	24 52 8.7	3.351	11	20 7 18.39	2.4754	19 2 9.3	10.963
12	18 6 20.99	2.6388	24 48 42.4	3.526	12	20 9 46.76	2.4702	18 51 16.7	11.110
13	18 8 59.28	2.6377	24 45 5.6	3.702	13	20 12 14.82	2.4651	18 40 16.7	11.257
14	18 11 37.51	2.6366	24 41 18.2	3.877	14	20 14 42.57	2.4600	18 29 9.5	11.404
15	18 14 15.67	2.6353	24 37 20.4	4.051	15	20 17 10.02	2.4548	18 17 55.1	11.551
16	18 16 53.74	2.6338	24 33 12.1	4.225	16	20 19 37.15	2.4495	18 6 33.6	11.698
17	18 19 31.72	2.6323	24 28 53.4	4.398	17	20 22 3.96	2.4443	17 55 5.1	11.845
18	18 22 9.61	2.6306	24 24 24.3	4.572	18	20 24 30.46	2.4391	17 43 29.8	11.992
19	18 24 47.39	2.6287	24 19 44.8	4.744	19	20 26 56.65	2.4338	17 31 47.7	12.139
20	18 27 25.05	2.6267	24 14 55.0	4.916	20	20 29 22.52	2.4286	17 19 58.9	12.286
21	18 30 2.60	2.6247	24 9 54.9	5.087	21	20 31 48.08	2.4233	17 8 3.6	12.433
22	18 32 40.02	2.6225	24 4 44.6	5.257	22	20 34 13.32	2.4181	16 56 1.8	12.580
23	18 35 17.30	2.6202	23 59 24.0	5.427	23	20 36 38.25	2.4128	16 43 53.7	12.727
24	18 37 54.44	2.6178	23 53 53.3	5.596	24	20 39 2.86	2.4075	16 31 39.3	12.874
	18 40 31.44	2.6152	S. 23 48 12.5	5.764		20 41 27.15	2.4022	S. 16 19 18.7	13.021

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 29.					WEDNESDAY 31.				
0	20 41 27.15	2.4023	S. 16 19 18.7	12.393	0	22 31 10.27	2.1854	S. 5 1 49.3	15.151
1	20 43 51.13	2.3970	16 6 52.2	12.492	1	22 33 21.30	2.1822	4 46 39.8	15.166
2	20 46 14.79	2.3918	15 54 19.7	12.590	2	22 35 32.13	2.1789	4 31 29.4	15.180
3	20 48 38.14	2.3865	15 41 41.4	12.686	3	22 37 42.77	2.1757	4 16 18.2	15.192
4	20 51 1.17	2.3813	15 28 57.4	12.780	4	22 39 53.22	2.1726	4 1 6.4	15.201
5	20 53 23.89	2.3761	15 16 7.8	12.872	5	22 42 3.48	2.1695	3 45 54.1	15.209
6	20 55 46.30	2.3708	15 3 12.7	12.962	6	22 44 13.56	2.1666	3 30 41.3	15.216
7	20 58 8.39	2.3656	14 50 12.3	13.052	7	22 46 23.47	2.1637	3 15 28.2	15.221
8	21 0 30.17	2.3605	14 37 6.5	13.139	8	22 48 33.20	2.1608	3 0 14.8	15.225
9	21 2 51.65	2.3554	14 23 55.6	13.224	9	22 50 42.76	2.1580	2 45 1.2	15.227
10	21 5 12.82	2.3502	14 10 39.6	13.308	10	22 52 52.16	2.1552	2 29 47.5	15.227
11	21 7 33.68	2.3451	13 57 18.6	13.390	11	22 55 1.39	2.1526	2 14 33.9	15.226
12	21 9 54.23	2.3400	13 43 52.8	13.469	12	22 57 10.47	2.1500	1 59 20.4	15.223
13	21 12 14.48	2.3350	13 30 22.3	13.547	13	22 59 19.39	2.1474	1 44 7.1	15.219
14	21 14 34.43	2.3300	13 16 47.1	13.623	14	23 1 28.16	2.1450	1 28 54.1	15.213
15	21 16 54.08	2.3250	13 3 7.5	13.698	15	23 3 36.79	2.1426	1 13 41.5	15.206
16	21 19 13.43	2.3200	12 49 23.4	13.771	16	23 5 45.27	2.1402	0 58 29.4	15.197
17	21 21 32.48	2.3151	12 35 35.0	13.842	17	23 7 53.61	2.1378	0 43 17.9	15.187
18	21 23 51.24	2.3102	12 21 42.4	13.911	18	23 10 1.81	2.1357	0 28 7.0	15.176
19	21 26 9.71	2.3054	12 7 45.7	13.978	19	23 12 9.89	2.1335	S. 0 12 56.8	15.162
20	21 28 27.89	2.3006	11 53 45.1	14.043	20	23 14 17.83	2.1313	N. 0 2 12.5	15.147
21	21 30 45.78	2.2958	11 39 40.6	14.107	21	23 16 25.65	2.1293	0 17 20.9	15.132
22	21 33 3.38	2.2910	11 25 32.3	14.168	22	23 18 33.35	2.1273	0 32 28.3	15.114
23	21 35 20.70	2.2863	S. 11 11 20.4	14.227	23	23 20 40.93	2.1254	N. 0 47 34.6	15.095
TUESDAY 30.					THURSDAY, SEPTEMBER 1.				
0	21 37 37.74	2.2817	S. 10 57 5.0	14.286	0	23 22 48.40	2.1236	N. 1 2 39.7	15.074
1	21 39 54.50	2.2771	10 42 46.1	14.343	PHASES OF THE MOON.				
2	21 42 10.99	2.2726	10 28 23.9	14.397					
3	21 44 27.21	2.2680	10 13 58.5	14.449					
4	21 46 43.15	2.2635	9 59 30.0	14.500					
5	21 48 58.83	2.2592	9 44 58.5	14.550	<div><div></div><div>d h m</div></div> <div>○ Full Moon . . . . . Aug. 1 16 28.8</div> <div>☾ Last Quarter . . . . . 8 18 13.0</div> <div>● New Moon . . . . . 16 22 34.1</div> <div>☾ First Quarter . . . . . 24 8 32.1</div> <div>○ Full Moon . . . . . 31 0 50.8</div>				
6	21 51 14.25	2.2548	9 30 24.0	14.597					
7	21 53 29.40	2.2504	9 15 46.8	14.643					
8	21 55 44.30	2.2462	9 1 6.9	14.687					
9	21 57 58.94	2.2419	8 46 24.4	14.728	<div><div></div><div>d h</div></div> <div>☾ Perigee . . . . . Aug. 12 17.1</div> <div>☾ Apogee . . . . . 28 13.3</div>				
10	22 0 13.33	2.2377	8 31 39.5	14.768					
11	22 2 27.47	2.2337	8 16 52.2	14.807					
12	22 4 41.37	2.2297	8 2 2.6	14.844					
13	22 6 55.03	2.2257	7 47 10.9	14.879					
14	22 9 8.45	2.2217	7 32 17.1	14.912					
15	22 11 21.63	2.2178	7 17 21.4	14.943					
16	22 13 34.58	2.2139	7 2 23.9	14.973					
17	22 15 47.30	2.2102	6 47 24.6	15.002					
18	22 17 59.80	2.2065	6 32 23.7	15.028					
19	22 20 12.08	2.2028	6 17 21.2	15.053					
20	22 22 24.14	2.1992	6 2 17.3	15.077					
21	22 24 35.99	2.1957	5 47 12.0	15.098					
22	22 26 47.62	2.1922	5 32 5.5	15.117					
23	22 28 59.05	2.1887	5 16 57.9	15.135					
24	22 31 10.27	2.1854	S. 5 1 49.3	15.151					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	SATURN W.	53 51 57	2051	55 44 12	2053	57 36 24	2056	59 28 31	2061
	Antares W.	51 29 37	2028	53 22 27	2032	55 15 11	2036	57 7 49	2041
	α Pegasi E.	54 31 16	2253	52 44 7	2268	50 57 20	2285	49 10 58	2304
	α Arietis E.	96 22 28	2043	94 30 1	2047	92 37 40	2051	90 45 25	2056
2	SATURN W.	68 47 9	2092	70 38 21	2099	72 29 21	2109	74 20 7	2119
	Antares W.	66 28 47	2075	68 20 25	2084	70 11 49	2094	72 2 58	2103
	α Arietis E.	81 26 26	2091	79 35 13	2100	77 44 14	2109	75 53 29	2120
3	SATURN W.	83 29 50	2177	85 18 52	2191	87 7 33	2205	88 55 53	2219
	Antares W.	81 14 34	2163	83 3 57	2176	84 53 0	2190	86 41 42	2205
	α Arietis E.	66 44 6	2182	64 55 11	2196	63 6 38	2210	61 18 26	2226
	Aldebaran E.	99 22 56	2214	97 34 50	2227	95 47 3	2241	93 59 37	2256
	MARS E.	101 14 18	2375	99 30 7	2389	97 46 16	2403	96 2 46	2418
4	Antares W.	95 39 33	2284	97 25 56	2300	99 11 55	2317	100 57 29	2335
	α Aquilæ W.	47 58 8	3362	49 21 8	3322	50 44 54	3288	52 9 19	3260
	α Arietis E.	52 23 23	2310	50 37 38	2328	48 52 19	2346	47 7 27	2366
	Aldebaran E.	85 7 57	2335	83 22 48	2351	81 38 3	2369	79 53 44	2387
	MARS E.	87 30 47	2499	85 49 33	2517	84 8 44	2535	82 28 19	2553
5	α Aquilæ W.	59 18 2	3179	60 44 36	3173	62 11 18	3168	63 38 6	3166
	α Arietis E.	38 30 12	2468	36 48 14	2489	35 6 46	2512	33 25 50	2535
	Aldebaran E.	71 18 38	2480	69 36 57	2500	67 55 44	2520	66 14 59	2540
	MARS E.	74 12 36	2646	72 34 44	2666	70 57 18	2685	69 20 18	2704
6	α Aquilæ W.	70 52 0	3180	72 18 33	3188	73 44 57	3195	75 11 12	3204
	Fomalhaut W.	46 19 34	3434	47 41 12	3408	49 3 20	3386	50 25 53	3367
	Aldebaran E.	57 58 10	2643	56 20 13	2663	54 42 44	2684	53 5 43	2706
	MARS E.	61 21 45	2801	59 47 19	2821	58 13 18	2840	56 39 42	2859
	Pollux E.	99 46 23	2604	98 7 33	2621	96 29 7	2640	94 51 6	2657
	SUN E.	122 31 26	2898	120 59 5	2918	119 27 9	2938	117 55 38	2957
7	α Aquilæ W.	82 19 28	3260	83 44 26	3274	85 9 8	3288	86 33 34	3302
	Fomalhaut W.	57 22 45	3318	58 46 36	3313	60 10 32	3312	61 34 30	3312
	α Pegasi W.	34 34 30	3173	36 1 11	3156	37 28 13	3142	38 55 32	3131
	Aldebaran E.	45 7 50	2816	43 33 43	2839	42 0 6	2862	40 26 59	2887
	MARS E.	48 57 44	2952	47 26 31	2969	45 55 40	2987	44 25 11	3005
	Pollux E.	86 46 52	2744	85 11 10	2761	83 35 51	2777	82 0 53	2793
	SUN E.	110 23 59	3051	108 54 49	3068	107 26 0	3086	105 57 33	3103
8	α Aquilæ W.	93 31 26	3379	94 54 6	3396	96 16 27	3413	97 38 29	3430
	Fomalhaut W.	68 34 8	3322	69 57 54	3326	71 21 35	3332	72 45 10	3337
	α Pegasi W.	46 14 19	3112	47 42 14	3113	49 10 8	3114	50 38 0	3117
	MARS E.	36 58 8	3089	35 29 45	3105	34 1 41	3120	32 33 56	3137
	Pollux E.	74 11 15	2871	72 38 19	2886	71 5 42	2900	69 33 23	2914
	SUN E.	98 40 26	3185	97 13 59	3201	95 47 51	3215	94 22 0	3230
9	Fomalhaut W.	79 41 22	3369	81 4 14	3377	82 26 57	3384	83 49 32	3392
	α Pegasi W.	57 56 23	3136	59 23 49	3140	60 51 10	3145	62 18 25	3150
	Pollux E.	61 56 8	2979	60 25 29	2992	58 55 6	3001	57 24 58	3015
	SUN E.	87 16 51	3296	85 52 35	3307	84 28 32	3319	83 4 42	3330

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	SATURN	W.	61 20 31	2065	63 12 24	2070	65 4 9	2076	66 55 45	2084
	Antares	W.	59 0 20	2046	60 52 42	2052	62 44 55	2059	64 36 57	2067
	α Pegasi	E.	47 25 5	2326	45 39 44	2351	43 54 59	2379	42 10 54	2410
	α Arietis	E.	88 53 18	2061	87 1 19	2068	85 9 30	2075	83 17 52	2083
2	SATURN	W.	76 10 37	2130	78 0 51	2141	79 50 48	2152	81 40 28	2164
	Antares	W.	73 53 52	2115	75 44 29	2126	77 34 49	2137	79 24 51	2150
	α Arietis	E.	74 3 1	2132	72 12 50	2143	70 22 56	2155	68 33 21	2169
3	SATURN	W.	90 43 52	2235	92 31 28	2250	94 18 41	2266	96 5 31	2282
	Antares	W.	88 30 2	2220	90 17 59	2235	92 5 34	2251	93 52 45	2267
	α Arietis	E.	59 30 37	2241	57 43 11	2258	55 56 10	2275	54 9 34	2292
	Aldebaran	E.	92 12 32	2270	90 25 49	2285	88 39 28	2302	86 53 31	2317
	MARS	E.	94 19 37	2433	92 36 50	2450	90 54 26	2466	89 12 25	2482
4	Antares	W.	102 42 38	2352	104 27 22	2370	106 11 40	2388	107 55 32	2406
	α Aquilæ	W.	53 34 17	2326	54 59 43	2317	56 25 32	2301	57 51 40	3189
	α Arietis	E.	45 23 3	2385	43 39 7	2405	41 55 39	2426	40 12 41	2446
	Aldebaran	E.	78 9 50	2405	76 26 22	2424	74 43 21	2442	73 0 46	2461
	MARS	E.	80 48 20	2572	79 8 46	2590	77 29 37	2609	75 50 54	2627
5	α Aquilæ	W.	65 4 56	3166	66 31 46	3167	67 58 35	3170	69 25 20	3174
	α Arietis	E.	31 45 26	2560	30 5 36	2586	28 26 20	2612	26 47 41	2639
	Aldebaran	E.	64 34 41	2560	62 54 51	2580	61 15 29	2601	59 36 35	2622
	MARS	E.	67 43 44	2724	66 7 36	2743	64 31 53	2763	62 56 36	2782
6	α Aquilæ	W.	76 37 16	3214	78 3 9	3225	79 28 49	3236	80 54 16	3248
	Fomalhaut	W.	51 48 47	3351	53 11 59	3340	54 35 24	3331	55 59 0	3323
	Aldebaran	E.	51 29 11	2777	49 53 7	2749	48 17 32	2721	46 42 26	2794
	MARS	E.	55 6 31	2878	53 33 44	2896	52 1 20	2915	50 29 20	2934
	Pollux	E.	93 13 28	2675	91 36 14	2692	89 59 24	2710	88 22 57	2726
	SUN	E.	116 24 31	2976	114 53 48	2994	113 23 28	3014	111 53 32	3032
7	α Aquilæ	W.	87 57 43	3317	89 21 35	3332	90 45 10	3347	92 8 27	3363
	Fomalhaut	W.	62 58 28	3312	64 22 26	3313	65 46 23	3315	67 10 17	3318
	α Pegasi	W.	40 23 4	3124	41 50 45	3118	43 18 33	3114	44 46 25	3113
	Aldebaran	E.	38 54 23	2912	37 22 19	2937	35 50 47	2964	34 19 49	2992
	MARS	E.	42 55 4	3022	41 25 19	3039	39 55 55	3066	38 26 51	3073
	Pollux	E.	80 26 16	2809	78 52 0	2825	77 18 5	2841	75 44 30	2856
	SUN	E.	104 29 27	3120	103 1 42	3137	101 34 17	3153	100 7 12	3169
8	α Aquilæ	W.	99 0 12	3447	100 21 35	3466	101 42 37	3484	103 3 19	3503
	Fomalhaut	W.	74 8 39	3343	75 32 1	3349	76 55 16	3356	78 18 23	3363
	α Pegasi	W.	52 5 49	3120	53 33 34	3124	55 1 15	3128	56 28 51	3131
	MARS	E.	31 6 31	3152	29 39 24	3168	28 12 36	3183	26 46 6	3198
	Pollux	E.	68 1 22	2928	66 29 39	2941	64 58 12	2954	63 27 2	2967
	SUN	E.	92 56 26	3244	91 31 9	3258	90 6 8	3270	88 41 22	3283
9	Fomalhaut	W.	85 11 58	3399	86 34 16	3407	87 56 25	3415	89 18 25	3423
	α Pegasi	W.	63 45 34	3155	65 12 37	3159	66 39 35	3164	68 6 27	3169
	Pollux	E.	55 55 4	3026	54 25 24	3037	52 55 57	3048	51 26 44	3058
	SUN	E.	81 41 5	3340	80 17 40	3351	78 54 27	3359	77 31 24	3369

GREENWICH MEAN TIME.									
LUNAR DISTANCES.									
Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Fomalhaut W.	90 40 16	3431	92 1 58	3438	93 23 31	3446	94 44 55	3453
	α Pegasi W.	69 33 13	3173	70 59 54	3178	72 26 29	3183	73 52 59	3186
	α Arietis W.	26 0 59	3093	27 29 17	3093	28 57 35	3093	30 25 53	3094
	Pollux E.	49 57 43	3069	48 28 55	3078	47 0 19	3088	45 31 55	3098
	SUN E.	76 8 32	3377	74 45 49	3386	73 23 16	3393	72 0 51	3400
11	Fomalhaut W.	101 29 33	3497	102 50 0	3506	104 10 17	3515	105 30 24	3523
	α Pegasi W.	81 4 25	3204	82 30 30	3206	83 56 32	3209	85 22 31	3211
	α Arietis W.	37 47 6	3100	39 15 16	3101	40 43 25	3102	42 11 32	3102
	Pollux E.	38 12 53	3147	36 45 40	3157	35 18 39	3168	33 51 51	3179
	SUN E.	65 10 39	3429	63 48 55	3433	62 27 16	3437	61 5 41	3440
12	α Pegasi W.	92 31 48	3220	93 57 34	3220	95 23 19	3221	96 49 3	3222
	α Arietis W.	49 32 0	3103	51 0 6	3103	52 28 12	3102	53 56 19	3101
	SUN E.	54 18 37	3452	52 57 19	3453	51 36 2	3453	50 14 45	3454
13	α Arietis W.	61 17 24	3091	62 45 45	3088	64 14 9	3085	65 42 37	3082
	Aldebaran W.	29 31 50	3277	30 56 28	3258	32 21 29	3241	33 46 50	3225
	SUN E.	43 28 20	3450	42 7 0	3448	40 45 38	3446	39 24 14	3444
14	α Arietis W.	73 6 2	3062	74 34 58	3057	76 4 0	3052	77 33 8	3047
	Aldebaran W.	40 57 53	3160	42 24 50	3149	43 52 0	3139	45 19 22	3129
	MARS W.	31 17 42	3308	32 41 44	3301	34 5 54	3295	35 30 11	3288
	SUN E.	32 36 34	3431	31 14 53	3429	29 53 9	3426	28 31 22	3423
18	SUN W.	12 45 30	3294	14 9 48	3266	15 34 39	3242	16 59 59	3219
	Spica E.	44 45 31	2839	43 11 54	2832	41 38 8	2825	40 4 12	2818
	SATURN E.	88 11 35	2848	86 38 10	2841	85 4 35	2832	83 30 49	2824
	Antares E.	90 23 17	2827	88 49 24	2819	87 15 21	2811	85 41 7	2803
19	SUN W.	24 12 22	3198	25 39 45	3126	27 7 23	3114	28 35 16	3102
	SATURN E.	75 39 20	2783	74 4 30	2775	72 29 30	2767	70 54 19	2759
	Antares E.	77 47 16	2761	76 11 57	2752	74 36 26	2744	73 0 45	2735
20	SUN W.	35 58 12	3047	37 27 27	3035	38 56 56	3025	40 26 38	3014
	SATURN E.	62 55 42	2718	61 19 26	2710	59 43 0	2702	58 6 23	2694
	Antares E.	64 59 25	2692	63 22 34	2684	61 45 32	2674	60 8 17	2666
21	SUN W.	47 58 23	2962	49 29 23	2952	51 0 36	2942	52 32 2	2931
	SATURN E.	50 0 37	2655	48 22 56	2647	46 45 5	2640	45 7 4	2632
	Antares E.	51 59 6	2621	50 20 39	2612	48 42 0	2602	47 3 8	2593
	α Aquilæ E.	104 53 2	3198	103 26 51	3181	102 0 19	3165	100 33 28	3150
22	SUN W.	60 12 32	2879	61 45 18	2868	63 18 18	2858	64 51 31	2847
	Antares E.	38 45 40	2547	37 5 32	2538	35 25 11	2528	33 44 37	2518
	α Aquilæ E.	93 14 54	3085	91 46 26	3073	90 17 44	3064	88 48 50	3055
23	SUN W.	72 41 6	2793	74 15 43	2782	75 50 35	2772	77 25 40	2760
	JUPITER W.	33 28 37	2609	35 7 20	2593	36 46 25	2577	38 25 52	2561
	VENUS W.	28 41 12	2892	30 13 41	2876	31 46 31	2860	33 19 41	2845
	α Aquilæ E.	81 21 53	3022	79 52 7	3018	78 22 16	3014	76 52 21	3012
	Fomalhaut E.	106 19 3	2920	104 47 10	2903	103 14 55	2887	101 42 19	2871

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
10	Fomalhaut	W.	96 6 9	3463	97 27 14	3471	98 48 10	3480	100 8 56	3488
	α Pegasi	W.	75 19 25	3190	76 45 46	3193	78 12 3	3197	79 38 16	3200
	α Arietis	W.	31 54 10	3095	33 22 26	3096	34 50 41	3097	36 18 54	3098
	Pollux	E.	44 3 43	3108	42 35 43	3118	41 7 55	3127	39 40 18	3137
	SUN	E.	70 38 35	3407	69 16 26	3413	67 54 24	3419	66 32 29	3423
11	Fomalhaut	W.	106 50 21	3535	108 10 7	3545	109 29 42	3555	110 49 5	3566
	α Pegasi	W.	86 48 27	3214	88 14 20	3215	89 40 11	3217	91 6 0	3218
	α Arietis	W.	43 39 39	3103	45 7 45	3104	46 35 50	3104	48 3 55	3104
	Pollux	E.	32 25 17	3191	30 58 57	3204	29 32 53	3189	28 7 6	3234
	SUN	E.	59 44 10	3443	58 22 42	3446	57 1 18	3448	55 39 56	3451
12	α Pegasi	W.	98 14 46	3223	99 40 28	3223	101 6 10	3224	102 31 51	3224
	α Arietis	W.	55 24 28	3100	56 52 38	3097	58 20 51	3096	59 49 6	3095
	SUN	E.	48 53 29	3454	47 32 13	3453	46 10 56	3453	44 49 39	3451
13	α Arietis	W.	67 11 9	3078	68 39 45	3074	70 8 26	3071	71 37 11	3066
	Aldebaran	W.	35 12 30	3110	36 38 27	3196	38 4 41	3183	39 31 10	3172
	SUN	E.	38 2 47	3442	36 41 18	3439	35 19 46	3438	33 58 12	3434
14	α Arietis	W.	79 2 23	3042	80 31 44	3036	82 1 12	3030	83 30 47	3026
	Aldebaran	W.	46 46 57	3119	48 14 44	3110	49 42 42	3100	51 10 52	3091
	MARS	W.	36 54 36	3282	38 19 9	3276	39 43 49	3269	41 8 37	3261
	SUN	E.	27 9 31	3421	25 47 38	3418	24 25 42	3416	23 3 44	3415
18	SUN	W.	18 25 46	3199	19 51 56	3183	21 18 26	3167	22 45 15	3152
	Spica	E.	38 30 7	2811	36 55 53	2803	35 21 29	2796	33 46 56	2790
	SATURN	E.	81 56 52	2816	80 22 45	2808	78 48 27	2800	77 13 59	2792
	Antares	E.	84 6 43	2794	82 32 7	2786	80 57 21	2778	79 22 24	2769
19	SUN	W.	30 3 23	3091	31 31 44	3078	33 0 20	3068	34 29 9	3056
	SATURN	E.	69 18 57	2750	67 43 24	2743	66 7 41	2735	64 31 47	2726
	Antares	E.	71 24 52	2727	69 48 48	2718	68 12 32	2709	66 36 4	2701
20	SUN	W.	41 56 33	3004	43 26 41	2993	44 57 2	2983	46 27 36	2973
	SATURN	E.	56 29 35	2686	54 52 36	2678	53 15 27	2670	51 38 7	2663
	Antares	E.	58 30 51	2657	56 53 13	2648	55 15 23	2639	53 37 21	2629
21	SUN	W.	54 3 42	2921	55 35 34	2910	57 7 40	2900	58 39 59	2889
	SATURN	E.	43 28 53	2625	41 50 32	2618	40 12 2	2611	38 33 22	2605
	Antares	E.	45 24 4	2584	43 44 47	2575	42 5 18	2565	40 25 35	2556
	α Aquilæ	E.	99 6 19	3135	97 38 52	3121	96 11 8	3108	94 43 8	3096
22	SUN	W.	66 24 58	2837	67 58 38	2825	69 32 33	2813	71 6 42	2803
	Antares	E.	32 3 49	2510	30 22 49	2499	28 41 35	2490	27 0 8	2481
	α Aquilæ	E.	87 19 45	3047	85 50 30	3039	84 21 5	3033	82 51 33	3026
23	SUN	W.	79 1 0	2750	80 36 34	2738	82 12 23	2728	83 48 26	2717
	JUPITER	W.	40 5 41	2546	41 45 50	2533	43 26 18	2519	45 7 5	2505
	VENUS	W.	34 53 11	2830	36 27 0	2816	38 1 7	2801	39 35 33	2788
	α Aquilæ	E.	75 22 23	3011	73 52 24	3011	72 22 25	3013	70 52 28	3015
	Fomalhaut	E.	100 9 23	2857	98 36 9	2842	97 2 36	2829	95 28 46	2817

GREENWICH MEAN TIME.											
LUNAR DISTANCES.											
Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.	
			° ' "		° ' "		° ' "		° ' "		
24	SUN	W.	85 24 43	2706	87 1 15	2695	88 38 1	2684	90 15 2	2674	
	JUPITER	W.	46 48 11	2492	48 29 35	2480	50 11 17	2467	51 53 16	2455	
	VENUS	W.	41 10 16	2775	42 45 16	2762	44 20 34	2749	45 56 9	2737	
	Spica	W.	34 16 35	2403	36 0 5	2391	37 43 52	2380	39 27 55	2368	
	α Aquilæ	E.	69 22 34	3019	67 52 45	3006	66 23 4	3003	64 53 32	3008	
	Fomalhaut	E.	93 54 40	2805	92 20 18	2794	90 45 42	2783	89 10 52	2773	
25	SUN	W.	98 23 39	2621	100 2 5	2612	101 40 44	2601	103 19 37	2592	
	JUPITER	W.	60 27 24	2398	62 11 2	2387	63 54 55	2376	65 39 4	2366	
	VENUS	W.	53 58 7	2677	55 35 18	2665	57 12 45	2654	58 50 27	2643	
	Spica	W.	48 12 9	2315	49 57 46	2306	51 43 37	2296	53 29 43	2285	
	α Aquilæ	E.	57 29 39	3124	56 1 59	3130	54 34 50	3179	53 8 16	3213	
	Fomalhaut	E.	81 13 51	2737	79 38 0	2732	78 2 3	2729	76 26 1	2723	
	α Pegasi	E.	101 46 18	2455	100 4 1	2443	98 21 28	2432	96 38 39	2422	
26	SUN	W.	111 37 18	2345	113 17 28	2337	114 57 50	2329	116 38 23	2321	
	JUPITER	W.	74 23 23	2318	76 8 56	2310	77 54 41	2301	79 40 39	2293	
	VENUS	W.	67 2 34	2591	68 41 41	2582	70 21 1	2572	72 0 34	2564	
	Spica	W.	62 23 46	2239	64 11 15	2231	65 58 56	2223	67 46 50	2215	
	Fomalhaut	E.	68 25 28	2731	66 49 29	2736	65 13 37	2743	63 37 54	2752	
	α Pegasi	E.	88 1 8	2377	86 17 0	2369	84 32 41	2362	82 48 12	2355	
27	JUPITER	W.	88 33 18	2258	90 20 20	2251	92 7 31	2246	93 54 50	2241	
	VENUS	W.	80 21 13	2524	82 1 53	2517	83 42 42	2512	85 23 39	2505	
	Spica	W.	76 49 6	2180	78 38 4	2174	80 27 11	2168	82 16 27	2163	
	SATURN	W.	33 25 48	2235	35 13 24	2225	37 1 15	2215	38 49 20	2206	
	Antares	W.	31 6 48	2178	32 55 49	2171	34 45 0	2165	36 34 20	2160	
	Fomalhaut	E.	55 43 16	2832	54 9 30	2838	52 36 17	2837	51 3 41	2830	
	α Pegasi	E.	74 3 39	2332	72 18 26	2329	70 33 9	2327	68 47 49	2326	
28	VENUS	W.	93 50 17	2483	95 31 54	2480	97 13 35	2478	98 55 19	2476	
	Spica	W.	91 24 29	2143	93 14 22	2141	95 4 18	2139	96 54 17	2137	
	SATURN	W.	47 52 32	2176	49 41 36	2172	51 30 46	2169	53 20 1	2165	
	Antares	W.	45 42 49	2139	47 32 48	2137	49 22 51	2135	51 12 57	2134	
	α Pegasi	E.	60 1 18	2336	58 16 11	2342	56 31 13	2349	54 46 25	2357	
	α Arietis	E.	102 8 7	2155	100 18 32	2153	98 28 53	2151	96 39 11	2149	
29	SATURN	W.	62 27 0	2162	64 16 25	2163	66 5 49	2164	67 55 11	2167	
	Antares	W.	60 23 48	2133	62 13 57	2135	64 4 3	2136	65 54 7	2139	
	α Arietis	E.	87 30 18	2149	85 40 33	2151	83 50 51	2153	82 1 12	2156	
30	SATURN	W.	77 0 49	2186	78 49 37	2193	80 38 15	2200	82 26 43	2206	
	Antares	W.	75 3 5	2161	76 52 31	2167	78 41 48	2174	80 30 55	2181	
	α Arietis	E.	72 54 22	2179	71 5 23	2186	69 16 34	2193	67 27 56	2200	
	Aldebaran	E.	105 30 12	2213	103 42 4	2218	101 54 3	2224	100 6 11	2231	
31	SATURN	W.	91 26 10	2250	93 13 23	2261	95 0 20	2272	96 47 1	2283	
	Antares	W.	89 33 32	2225	91 21 23	2235	93 8 58	2246	94 56 17	2257	
	α Aquilæ	W.	43 24 7	3541	44 43 46	3470	46 4 44	3408	47 26 52	3332	
	α Arietis	E.	58 27 56	2248	56 40 40	2260	54 53 41	2271	53 6 59	2284	
	Aldebaran	E.	91 9 38	2273	89 22 59	2283	87 36 35	2294	85 50 27	2305	
	MARS	E.	110 53 9	2414	109 9 54	2425	107 26 55	2436	105 44 12	2448	



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
24	SUN	W.	91 52 17	2663	93 29 46	2652	95 7 30	2642	96 45 28	2632
	JUPITER	W.	53 35 33	2443	55 18 6	2431	57 0 56	2420	58 44 2	2409
	VENUS	W.	47 32 0	2724	49 8 8	2712	50 44 32	2700	52 21 12	2689
	Spica	W.	41 12 15	2358	42 56 50	2347	44 41 41	2337	46 26 47	2326
	α Aquilæ	E.	63 24 11	3053	61 55 4	3068	60 26 15	3083	58 57 45	3105
	Fomalhaut	E.	87 35 49	2764	86 0 34	2756	84 25 9	2749	82 49 34	2743
25	SUN	W.	104 58 43	2322	106 38 3	2373	108 17 35	2364	109 57 20	2354
	JUPITER	W.	67 23 27	2356	69 8 5	2346	70 52 57	2337	72 38 3	2327
	VENUS	W.	60 28 23	2632	62 6 34	2621	63 45 0	2611	65 23 40	2601
	Spica	W.	55 16 4	2276	57 2 39	2266	58 49 28	2258	60 36 30	2248
	α Aquilæ	E.	51 42 22	3251	50 17 13	3295	48 52 56	3345	47 29 36	3400
	Fomalhaut	E.	74 49 55	2724	73 13 47	2724	71 37 39	2725	70 1 32	2727
	α Pegasi	E.	94 55 36	2412	93 12 19	2403	91 28 48	2394	89 45 4	2385
26	SUN	W.	118 19 7	2314	120 0 1	2306	121 41 6	2299	123 22 20	2293
	JUPITER	W.	81 26 49	2285	83 13 11	2278	84 59 43	2270	86 46 26	2264
	VENUS	W.	73 40 19	2355	75 20 16	2347	77 0 24	2339	78 40 43	2331
	Spica	W.	69 34 55	2228	71 23 11	2200	73 11 39	2193	75 0 17	2186
	Fomalhaut	E.	62 2 23	2765	60 27 7	2776	58 52 8	2792	57 17 30	2811
	α Pegasi	E.	81 3 33	2349	79 18 45	2344	77 33 50	2339	75 48 47	2335
27	JUPITER	W.	95 42 17	2237	97 29 50	2232	99 17 30	2229	101 5 15	2226
	VENUS	W.	87 4 45	2499	88 45 59	2495	90 27 19	2491	92 8 45	2487
	Spica	W.	84 5 50	2158	85 55 21	2154	87 44 58	2150	89 34 41	2147
	SATURN	W.	40 37 38	2199	42 26 7	2192	44 14 47	2186	46 3 35	2180
	Antares	W.	38 23 48	2155	40 13 24	2151	42 3 6	2146	43 52 55	2143
	Fomalhaut	E.	49 31 48	2958	48 0 43	3001	46 30 32	3051	45 1 22	3110
	α Pegasi	E.	67 2 28	2326	65 17 7	2327	63 31 47	2329	61 46 30	2333
28	VENUS	W.	100 37 6	2475	102 18 55	2474	104 0 45	2474	105 42 35	2475
	Spica	W.	98 44 19	2137	100 34 22	2136	102 24 26	2136	104 14 30	2137
	SATURN	W.	55 9 21	2164	56 58 43	2162	58 48 8	2161	60 37 34	2161
	Antares	W.	53 3 5	2132	54 53 15	2132	56 43 26	2132	58 33 37	2132
	α Pegasi	E.	53 1 49	2368	51 17 28	2380	49 33 24	2394	47 49 41	2410
	α Arietis	E.	94 49 26	2147	92 59 39	2147	91 9 52	2147	89 20 5	2147
29	SATURN	W.	69 44 29	2109	71 33 43	2173	73 22 51	2177	75 11 53	2181
	Antares	W.	67 44 6	2143	69 34 0	2146	71 23 49	2151	73 13 31	2156
	α Arietis	E.	80 11 38	2159	78 22 9	2165	76 32 46	2168	74 43 30	2173
30	SATURN	W.	84 15 1	2214	86 3 8	2223	87 51 2	2231	89 38 43	2241
	Antares	W.	82 19 51	2188	84 8 36	2197	85 57 8	2206	87 45 27	2215
	α Arietis	E.	65 39 29	2209	63 51 15	2218	62 3 14	2228	60 15 28	2237
	Aldebaran	E.	98 18 29	2258	96 30 58	2245	94 43 38	2254	92 56 31	2264
31	SATURN	W.	98 33 25	2295	100 19 32	2308	102 5 20	2320	103 50 50	2333
	Antares	W.	96 43 20	2269	98 30 5	2281	100 16 33	2294	102 2 42	2307
	α Aquilæ	W.	48 50 3	3306	50 14 8	3265	51 39 0	3230	53 4 34	3200
	α Arietis	E.	51 20 36	2297	49 34 32	2311	47 48 49	2325	46 3 26	2340
	Aldebaran	E.	84 4 35	2317	82 19 1	2330	80 33 45	2343	78 48 48	2357
	MARS	E.	104 1 45	2460	102 19 35	2472	100 37 43	2485	98 56 9	2498

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>'</sup> <sup>"</sup>	<sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Thur.	1	10 42 31.49	9.065	N. 8 11 16.2	-54.52	15 53.75	64.41	0 9.48	0.789
Frid.	2	10 46 8.90	9.053	7 49 23.8	54.84	15 53.98	64.37	0 28.56	0.801
Sat.	3	10 49 46.03	9.042	7 27 23.8	55.15	15 54.21	64.33	0 47.93	0.812
SUN.	4	10 53 22.92	9.032	7 5 16.5	-55.45	15 54.44	64.29	1 7.54	0.822
Mon.	5	10 56 59.57	9.023	6 43 2.1	55.74	15 54.68	64.26	1 27.39	0.831
Tues.	6	11 0 36.02	9.015	6 20 41.0	56.01	15 54.92	64.23	1 47.43	0.839
Wed.	7	11 4 12.28	9.007	5 58 13.4	-56.27	15 55.16	64.20	2 7.68	0.846
Thur.	8	11 7 48.36	9.000	5 35 39.8	56.52	15 55.40	64.17	2 28.08	0.853
Frid.	9	11 11 24.31	8.995	5 13 0.4	56.75	15 55.64	64.15	2 48.64	0.859
Sat.	10	11 15 0.12	8.990	4 50 15.6	-56.97	15 55.88	64.13	3 9.33	0.864
SUN.	11	11 18 35.82	8.985	4 27 25.8	57.18	15 56.13	64.11	3 30.13	0.869
Mon.	12	11 22 11.42	8.981	4 4 31.1	57.37	15 56.38	64.09	3 51.02	0.873
Tues.	13	11 25 46.94	8.979	3 41 32.1	-57.54	15 56.63	64.08	4 12.01	0.875
Wed.	14	11 29 22.40	8.977	3 18 29.1	57.70	15 56.88	64.07	4 33.03	0.877
Thur.	15	11 32 57.81	8.975	2 55 22.4	57.85	15 57.14	64.06	4 54.12	0.879
Frid.	16	11 36 33.20	8.974	2 32 12.3	-57.98	15 57.40	64.06	5 15.21	0.880
Sat.	17	11 40 8.57	8.974	2 8 59.4	58.09	15 57.67	64.06	5 36.35	0.880
SUN.	18	11 43 43.95	8.974	1 45 43.8	58.19	15 57.94	64.06	5 57.46	0.880
Mon.	19	11 47 19.35	8.976	1 22 26.0	-58.28	15 58.21	64.07	6 18.56	0.878
Tues.	20	11 50 54.78	8.978	0 59 6.3	58.35	15 58.48	64.08	6 39.62	0.876
Wed.	21	11 54 30.27	8.981	0 35 45.1	58.41	15 58.75	64.09	7 0.63	0.873
Thur.	22	11 58 5.84	8.984	N. 0 12 22.7	-58.45	15 59.02	64.11	7 21.55	0.870
Frid.	23	12 1 41.50	8.988	S. 0 11 0.5	58.48	15 59.30	64.13	7 42.40	0.865
Sat.	24	12 5 17.28	8.993	0 34 24.3	58.49	15 59.58	64.15	8 3.11	0.860
SUN.	25	12 8 53.18	8.999	0 57 48.3	-58.50	15 59.86	64.17	8 23.70	0.854
Mon.	26	12 12 29.25	9.005	1 21 12.1	58.49	16 0.14	64.20	8 44.14	0.848
Tues.	27	12 16 5.49	9.013	1 44 35.4	58.46	16 0.41	64.23	9 4.38	0.840
Wed.	28	12 19 41.94	9.023	2 7 58.0	-58.42	16 0.69	64.26	9 24.44	0.831
Thur.	29	12 23 18.61	9.033	2 31 19.4	58.36	16 0.97	64.30	9 44.26	0.821
Frid.	30	12 26 55.53	9.044	2 54 39.4	58.29	16 1.25	64.34	10 3.84	0.810
Sat.	31	12 30 32.73	9.056	S. 3 17 57.6	-58.21	16 1.52	64.38	10 23.14	0.798

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.13 from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations, increasing.

AT GREENWICH MEAN NOON.								
Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Thur.	1	10 42 31.51	9.067	N. 8 11 16.0	-54.53	0 9.48	0.789	10 42 40.99
Frid.	2	10 46 8.97	9.055	7 49 23.4	54.86	0 28.57	0.801	10 46 37.54
Sat.	3	10 49 46.15	9.044	7 27 23.0	55.17	0 47.94	0.812	10 50 34.09
SUN.	4	10 53 23.09	9.034	7 5 15.4	-55.47	1 7.56	0.822	10 54 30.65
Mon.	5	10 56 59.79	9.025	6 43 0.7	55.75	1 27.41	0.831	10 58 27.20
Tues.	6	11 0 36.29	9.017	6 20 39.3	56.02	1 47.46	0.839	11 2 23.75
Wed.	7	11 4 12.60	9.010	5 58 11.4	-56.29	2 7.71	0.846	11 6 20.31
Thur.	8	11 7 48.74	9.003	5 35 37.5	56.54	2 28.12	0.853	11 10 16.86
Frid.	9	11 11 24.73	8.997	5 12 57.8	56.77	2 48.68	0.859	11 14 13.41
Sat.	10	11 15 0.59	8.992	4 50 12.6	-56.99	3 9.38	0.864	11 18 9.97
SUN.	11	11 18 36.34	8.988	4 27 22.4	57.19	3 30.18	0.869	11 22 6.52
Mon.	12	11 22 11.99	8.984	4 4 27.4	57.38	3 51.08	0.873	11 26 3.07
Tues.	13	11 25 47.56	8.981	3 41 28.0	-57.56	4 12.07	0.875	11 29 59.63
Wed.	14	11 29 23.08	8.979	3 18 24.7	57.72	4 33.10	0.877	11 33 56.18
Thur.	15	11 32 58.54	8.977	2 55 17.6	57.86	4 54.19	0.879	11 37 52.73
Frid.	16	11 36 33.99	8.976	2 32 7.2	-57.99	5 15.29	0.880	11 41 49.28
Sat.	17	11 40 9.41	8.976	2 8 53.9	58.11	5 36.43	0.880	11 45 45.84
SUN.	18	11 43 44.84	8.977	1 45 38.0	58.21	5 57.55	0.880	11 49 42.39
Mon.	19	11 47 20.29	8.978	1 22 19.8	-58.30	6 18.65	0.878	11 53 38.94
Tues.	20	11 50 55.78	8.980	0 58 59.8	58.37	6 39.72	0.876	11 57 35.50
Wed.	21	11 54 31.32	8.983	0 35 38.2	58.42	7 0.73	0.873	12 1 32.05
Thur.	22	11 58 6.94	8.986	N. 0 12 15.5	-58.46	7 21.66	0.870	12 5 28.60
Frid.	23	12 1 42.65	8.991	S. 0 11 8.1	58.49	7 42.51	0.865	12 9 25.16
Sat.	24	12 5 18.48	8.996	0 34 32.2	58.50	8 3.23	0.860	12 13 21.71
SUN.	25	12 8 54.44	9.002	0 57 56.5	-58.51	8 23.82	0.854	12 17 18.26
Mon.	26	12 12 30.56	9.009	1 21 20.6	58.49	8 44.26	0.848	12 21 14.82
Tues.	27	12 16 6.86	9.017	1 44 44.3	58.47	9 4.51	0.840	12 25 11.37
Wed.	28	12 19 43.35	9.025	2 8 7.2	-58.43	9 24.57	0.831	12 29 7.92
Thur.	29	12 23 20.08	9.035	2 31 28.9	58.38	9 44.39	0.821	12 33 4.47
Frid.	30	12 26 57.05	9.046	2 54 49.2	58.31	10 3.98	0.810	12 37 1.03
Sat.	31	12 30 34.30	9.058	S. 3 18 7.7	-58.23	10 23.28	0.798	12 40 57.58
Note.—The semidiameter for mean noon may be assumed the same as that for apparent noon. The sign — prefixed to the hourly change of declination indicates that north declinations are decreasing; south declinations, increasing.								Diff. for 1 Hour, +9°.8565. (Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
		$^{\circ}$ $'$ $''$	$^{\circ}$ $'$ $''$	$''$	$^{\circ}$ $'$ $''$			$^h$ $^m$ $^s$
1	244	159 2 19.5	1 28.5	145.24	+ 0.47	0.0037401	-43.7	13 15 8.39
2	245	159 60 26.1	59 35.0	145.31	0.53	0.0036350	43.9	13 11 12.48
3	246	160 58 34.5	57 43.3	145.39	0.55	0.0035294	44.1	13 7 16.58
4	247	161 56 44.7	55 53.4	145.47	+ 0.53	0.0034232	-44.3	13 3 20.67
5	248	162 54 56.9	54 5.4	145.55	0.49	0.0033164	44.6	12 59 24.76
6	249	163 53 10.9	52 19.3	145.63	0.42	0.0032091	44.9	12 55 28.85
7	250	164 51 27.2	50 35.5	145.71	+ 0.32	0.0031010	-45.2	12 51 32.95
8	251	165 49 45.4	48 53.6	145.80	0.21	0.0029920	45.6	12 47 37.04
9	252	166 48 5.8	47 13.9	145.89	+ 0.08	0.0028820	46.0	12 43 41.13
10	253	167 46 28.3	45 36.3	145.98	- 0.04	0.0027710	-46.5	12 39 45.22
11	254	168 44 52.8	44 0.7	146.07	0.17	0.0026588	47.0	12 35 49.32
12	255	169 43 19.5	42 27.3	146.16	0.29	0.0025455	47.5	12 31 53.41
13	256	170 41 48.1	40 55.8	146.24	- 0.40	0.0024309	-48.0	12 27 57.50
14	257	171 40 18.9	39 26.5	146.32	0.49	0.0023150	48.5	12 24 1.60
15	258	172 38 51.5	37 59.0	146.40	0.56	0.0021977	49.1	12 20 5.69
16	259	173 37 26.2	36 33.6	146.48	- 0.59	0.0020792	-49.7	12 16 9.78
17	260	174 36 2.6	35 9.9	146.56	0.59	0.0019594	50.2	12 12 13.88
18	261	175 34 41.0	33 48.2	146.64	0.56	0.0018383	50.7	12 8 17.97
19	262	176 33 21.1	32 28.2	146.71	- 0.50	0.0017162	-51.1	12 4 22.06
20	263	177 32 3.0	31 10.0	146.78	0.43	0.0015931	51.5	12 0 26.15
21	264	178 30 46.6	29 53.5	146.85	0.32	0.0014691	51.8	11 56 30.25
22	265	179 29 31.9	28 38.7	146.92	- 0.20	0.0013445	-52.1	11 52 34.34
23	266	180 28 18.9	27 25.6	146.99	- 0.07	0.0012193	52.3	11 48 38.43
24	267	181 27 7.6	26 14.2	147.06	+ 0.07	0.0010936	52.4	11 44 42.52
25	268	182 25 58.1	25 4.6	147.14	+ 0.20	0.0009679	-52.4	11 40 46.62
26	269	183 24 50.2	23 56.6	147.21	0.32	0.0008421	52.4	11 36 50.71
27	270	184 23 44.2	22 50.5	147.29	0.41	0.0007162	52.4	11 32 54.81
28	271	185 22 40.0	21 46.2	147.37	+ 0.49	0.0005906	-52.3	11 28 58.90
29	272	186 21 37.8	20 43.9	147.45	0.54	0.0004654	52.1	11 25 2.99
30	273	187 20 37.4	19 43.4	147.53	0.57	0.0003405	51.9	11 21 7.08
31	274	188 19 39.2	18 45.1	147.61	+ 0.56	0.0002161	-51.7	11 17 11.18
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0.0.								Diff. for 1 Hour. —9 <sup>h</sup> .8296. (Table II.)

GREENWICH MEAN TIME.									
Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	16 5.3	15 59.4	58 56.3	-1.75	58 34.3	-1.89	13 5.6	2.01	15.1
2	15 53.0	15 46.4	58 10.9	1.99	57 46.6	2.05	13 53.6	2.00	16.1
3	15 39.6	15 32.9	57 21.8	2.06	56 57.2	2.03	14 41.7	2.02	17.1
4	15 26.4	15 20.1	56 33.1	-1.97	56 10.0	-1.87	15 30.5	2.05	18.1
5	15 14.2	15 8.7	55 48.3	1.73	55 28.4	1.58	16 20.3	2.09	19.1
6	15 3.8	14 59.5	55 10.4	1.41	54 54.6	1.22	17 10.7	2.11	20.1
7	14 55.9	14 52.9	54 41.2	-1.01	54 30.3	-0.80	18 1.4	2.10	21.1
8	14 50.6	14 49.1	54 21.9	0.59	54 16.1	-0.38	18 51.5	2.07	22.1
9	14 48.2	14 48.0	54 12.9	-0.16	54 12.2	+0.04	19 40.4	2.01	23.1
10	14 48.5	14 49.5	54 13.9	+0.24	54 17.9	+0.43	20 27.8	1.94	24.1
11	14 51.2	14 53.5	54 24.1	0.60	54 32.3	0.76	21 13.5	1.88	25.1
12	14 56.2	14 59.3	54 42.3	0.90	54 53.8	1.02	21 57.9	1.83	26.1
13	15 2.9	15 6.7	55 6.8	+1.13	55 20.9	+1.21	22 41.4	1.81	27.1
14	15 10.8	15 15.0	55 35.8	1.27	55 51.4	1.32	23 24.9	1.82	28.1
15	15 19.4	15 23.7	56 7.4	1.34	56 23.5	1.34	6		29.1
16	15 28.1	15 32.4	56 39.6	+1.33	56 55.4	+1.30	0 9.1	1.87	0.5
17	15 36.6	15 40.7	57 10.9	1.26	57 25.7	1.21	0 55.0	1.96	1.5
18	15 44.5	15 48.2	57 39.9	1.15	57 53.4	1.09	1 43.6	2.09	2.5
19	15 51.7	15 54.9	58 6.1	+1.03	58 18.0	+0.95	2 35.6	2.24	3.5
20	15 57.9	16 0.7	58 29.0	0.88	58 39.2	0.82	3 31.1	2.39	4.5
21	16 3.2	16 5.6	58 48.6	0.75	58 57.1	0.67	4 29.8	2.49	5.5
22	16 7.6	16 9.4	59 4.6	+0.58	59 11.1	+0.50	5 30.3	2.53	6.5
23	16 10.9	16 12.0	59 16.6	0.41	59 20.9	0.30	6 30.6	2.48	7.5
24	16 12.9	16 13.3	59 23.9	+0.19	59 25.4	+0.06	7 29.0	2.37	8.5
25	16 13.2	16 12.7	59 25.3	-0.08	59 23.4	-0.24	8 24.4	2.25	9.5
26	16 11.7	16 10.1	59 19.6	0.40	59 13.8	0.57	9 16.9	2.13	10.5
27	16 8.0	16 5.2	59 5.9	0.75	58 55.9	0.92	10 6.9	2.05	11.5
28	16 1.9	15 58.1	58 43.8	-1.09	58 29.8	-1.24	10 55.4	2.00	12.5
29	15 53.8	15 49.1	58 14.0	1.38	57 56.6	1.50	11 43.2	1.99	13.5
30	15 44.0	15 38.7	57 38.0	1.59	57 18.5	1.65	12 31.3	2.02	14.5
31	15 33.2	15 27.7	56 58.3	-1.69	56 38.0	-1.69	13 20.3	2.06	15.5

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 1.					SATURDAY 3.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	23 22 48.40	2.1236	N. 1 2 39.7	15.074	0	1 3 43.20	2.1014	N. 12 18 21.2	12.655
1	23 24 55.76	2.1218	1 17 43.5	15.052	1	1 5 49.31	2.1022	12 30 57.0	12.558
2	23 27 3.02	2.1201	1 32 46.0	15.029	2	1 7 55.46	2.1029	12 43 28.2	12.481
3	23 29 10.17	2.1184	1 47 47.0	15.005	3	1 10 1.66	2.1037	12 55 54.7	12.402
4	23 31 17.23	2.1168	2 2 46.6	14.979	4	1 12 7.91	2.1045	13 8 16.4	12.322
5	23 33 24.19	2.1153	2 17 44.5	14.952	5	1 14 14.20	2.1053	13 20 33.3	12.243
6	23 35 31.06	2.1138	2 32 40.8	14.923	6	1 16 20.55	2.1063	13 32 45.4	12.161
7	23 37 37.85	2.1124	2 47 35.3	14.893	7	1 18 26.96	2.1072	13 44 52.6	12.078
8	23 39 44.55	2.1110	3 2 28.0	14.862	8	1 20 33.42	2.1082	13 56 54.8	11.995
9	23 41 51.17	2.1097	3 17 18.7	14.828	9	1 22 39.94	2.1092	14 8 52.0	11.911
10	23 43 57.72	2.1085	3 32 7.4	14.795	10	1 24 46.52	2.1102	14 20 44.1	11.826
11	23 46 4.19	2.1073	3 46 54.1	14.760	11	1 26 53.16	2.1112	14 32 31.1	11.740
12	23 48 10.59	2.1062	4 1 38.6	14.723	12	1 28 59.87	2.1123	14 44 12.9	11.653
13	23 50 16.93	2.1051	4 16 20.9	14.685	13	1 31 6.64	2.1134	14 55 49.5	11.567
14	23 52 23.20	2.1041	4 31 0.8	14.646	14	1 33 13.48	2.1146	15 7 20.9	11.478
15	23 54 29.42	2.1032	4 45 38.4	14.606	15	1 35 20.39	2.1157	15 18 46.9	11.389
16	23 56 35.58	2.1023	5 0 13.5	14.564	16	1 37 27.37	2.1169	15 30 7.6	11.300
17	23 58 41.69	2.1015	5 14 46.1	14.522	17	1 39 34.42	2.1181	15 41 22.9	11.209
18	0 0 47.76	2.1007	5 29 16.1	14.477	18	1 41 41.54	2.1193	15 52 32.7	11.118
19	0 2 53.78	2.1000	5 43 43.3	14.432	19	1 43 48.73	2.1205	16 3 37.1	11.027
20	0 4 59.76	2.0993	5 58 7.9	14.386	20	1 45 56.00	2.1218	16 14 35.9	10.933
21	0 7 5.70	2.0987	6 12 29.6	14.338	21	1 48 3.35	2.1232	16 25 29.1	10.840
22	0 9 11.61	2.0982	6 26 48.4	14.288	22	1 50 10.78	2.1244	16 36 16.7	10.746
23	0 11 17.48	2.0977	N. 6 41 4.2	14.238	23	1 52 18.28	2.1257	N. 16 46 58.6	10.651
FRIDAY 2.					SUNDAY 4.				
0	0 13 23.33	2.0972	N. 6 55 17.0	14.187	0	1 54 25.87	2.1271	N. 16 57 34.8	10.555
1	0 15 29.15	2.0968	7 9 26.7	14.135	1	1 56 33.53	2.1284	17 8 5.2	10.459
2	0 17 34.95	2.0963	7 23 33.2	14.082	2	1 58 41.28	2.1298	17 18 29.9	10.362
3	0 19 40.74	2.0959	7 37 36.5	14.027	3	2 0 49.11	2.1312	17 28 48.7	10.264
4	0 21 46.51	2.0956	7 51 36.5	13.971	4	2 2 57.03	2.1327	17 39 1.6	10.166
5	0 23 52.26	2.0952	8 5 33.0	13.914	5	2 5 5.03	2.1340	17 49 8.6	10.067
6	0 25 58.01	2.0957	8 19 26.2	13.857	6	2 7 13.11	2.1354	17 59 9.7	9.967
7	0 28 3.75	2.0957	8 33 15.8	13.797	7	2 9 21.28	2.1369	18 9 4.7	9.867
8	0 30 9.49	2.0957	8 47 1.8	13.737	8	2 11 29.54	2.1383	18 18 53.7	9.767
9	0 32 15.23	2.0957	9 0 44.2	13.677	9	2 13 37.88	2.1397	18 28 36.7	9.665
10	0 34 20.97	2.0957	9 14 23.0	13.614	10	2 15 46.31	2.1412	18 38 13.5	9.562
11	0 36 26.72	2.0958	9 27 57.9	13.550	11	2 17 54.83	2.1427	18 47 44.2	9.459
12	0 38 32.47	2.0960	9 41 29.0	13.486	12	2 20 3.44	2.1442	18 57 8.6	9.356
13	0 40 38.24	2.0962	9 54 56.2	13.420	13	2 22 12.14	2.1457	19 6 26.9	9.253
14	0 42 44.02	2.0965	10 8 19.4	13.354	14	2 24 20.92	2.1472	19 15 38.9	9.147
15	0 44 49.82	2.0968	10 21 38.7	13.287	15	2 26 29.80	2.1487	19 24 44.6	9.041
16	0 46 55.64	2.0972	10 34 53.8	13.218	16	2 28 38.76	2.1501	19 33 43.9	8.935
17	0 49 1.48	2.0975	10 48 4.8	13.148	17	2 30 47.81	2.1516	19 42 36.9	8.831
18	0 51 7.34	2.0980	11 1 11.6	13.078	18	2 32 56.95	2.1531	19 51 23.6	8.724
19	0 53 13.24	2.0985	11 14 14.2	13.007	19	2 35 6.18	2.1546	20 0 3.8	8.616
20	0 55 19.16	2.0990	11 27 12.5	12.935	20	2 37 15.50	2.1561	20 8 37.5	8.507
21	0 57 25.12	2.0996	11 40 6.4	12.861	21	2 39 24.91	2.1575	20 17 4.7	8.399
22	0 59 31.11	2.1002	11 52 55.8	12.787	22	2 41 34.40	2.1589	20 25 25.4	8.291
23	1 1 37.14	2.1008	12 5 40.8	12.712	23	2 43 43.98	2.1604	20 33 39.6	8.182
24	1 3 43.20	2.1014	N. 12 18 21.2	12.635	24	2 45 53.65	2.1619	N. 20 41 47.2	8.072

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 5.					WEDNESDAY 7.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	2 45 53.65	2.1619	N.20 41 47.2	8.072	0	4 30 57.75	2.2044	N.24 55 11.8	2.385
1	2 48 3.41	2.1633	20 49 48.2	7.961	1	4 33 10.02	2.2044	24 57 31.2	2.262
2	2 50 13.25	2.1648	20 57 42.5	7.850	2	4 35 22.28	2.2043	24 59 43.2	2.138
3	2 52 23.18	2.1662	21 5 30.2	7.739	3	4 37 34.54	2.2042	25 1 47.8	2.015
4	2 54 33.19	2.1675	21 13 11.2	7.627	4	4 39 46.79	2.2041	25 3 45.0	1.892
5	2 56 43.28	2.1689	21 20 45.4	7.514	5	4 41 59.03	2.2039	25 5 34.8	1.768
6	2 58 53.46	2.1703	21 28 12.9	7.402	6	4 44 11.26	2.2037	25 7 17.2	1.646
7	3 1 3.72	2.1718	21 35 33.6	7.288	7	4 46 23.47	2.2034	25 8 52.3	1.523
8	3 3 14.07	2.1732	21 42 47.5	7.175	8	4 48 35.67	2.2031	25 10 20.0	1.400
9	3 5 24.50	2.1744	21 49 54.6	7.061	9	4 50 47.84	2.2027	25 11 40.3	1.277
10	3 7 35.00	2.1757	21 56 54.8	6.946	10	4 52 59.99	2.2023	25 12 53.2	1.153
11	3 9 45.59	2.1771	22 3 48.1	6.831	11	4 55 12.11	2.2018	25 13 58.7	1.030
12	3 11 56.25	2.1783	22 10 34.5	6.716	12	4 57 24.21	2.2014	25 14 56.8	0.907
13	3 14 6.99	2.1796	22 17 14.0	6.600	13	4 59 36.28	2.2008	25 15 47.6	0.785
14	3 16 17.80	2.1808	22 23 46.5	6.484	14	5 1 48.31	2.2002	25 16 31.0	0.662
15	3 18 28.69	2.1821	22 30 12.1	6.368	15	5 4 0.30	2.1995	25 17 7.1	0.540
16	3 20 39.65	2.1832	22 36 30.7	6.251	16	5 6 12.25	2.1988	25 17 35.8	0.417
17	3 22 50.68	2.1844	22 42 42.2	6.133	17	5 8 24.16	2.1981	25 17 57.1	0.294
18	3 25 1.78	2.1856	22 48 46.7	6.016	18	5 10 36.02	2.1973	25 18 11.1	0.172
19	3 27 12.95	2.1867	22 54 44.1	5.898	19	5 12 47.83	2.1964	25 18 17.8	+ 0.051
20	3 29 24.19	2.1878	23 0 34.5	5.781	20	5 14 59.59	2.1956	25 18 17.2	- 0.071
21	3 31 35.49	2.1888	23 6 17.8	5.662	21	5 17 11.30	2.1947	25 18 9.3	0.193
22	3 33 46.85	2.1898	23 11 53.9	5.543	22	5 19 22.95	2.1937	25 17 54.0	0.316
23	3 35 58.27	2.1908	N.23 17 22.9	5.424	23	5 21 34.54	2.1927	N.25 17 31.4	0.437
TUESDAY 6.					THURSDAY 8.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	3 38 9.75	2.1918	N.23 22 44.8	5.305	0	5 23 46.07	2.1916	N.25 17 1.6	0.557
1	3 40 21.29	2.1928	23 27 59.5	5.186	1	5 25 57.53	2.1905	25 16 24.5	0.678
2	3 42 32.88	2.1937	23 33 7.1	5.066	2	5 28 8.93	2.1893	25 15 40.2	0.799
3	3 44 44.53	2.1946	23 38 7.4	4.946	3	5 30 20.25	2.1881	25 14 48.6	0.920
4	3 46 56.23	2.1954	23 43 0.6	4.826	4	5 32 31.50	2.1868	25 13 49.8	1.041
5	3 49 7.98	2.1962	23 47 46.5	4.705	5	5 34 42.67	2.1856	25 12 43.7	1.161
6	3 51 19.78	2.1970	23 52 25.2	4.584	6	5 36 53.77	2.1842	25 11 30.5	1.281
7	3 53 31.62	2.1978	23 56 56.6	4.463	7	5 39 4.78	2.1828	25 10 10.0	1.401
8	3 55 43.51	2.1985	24 1 20.8	4.342	8	5 41 15.71	2.1814	25 8 42.4	1.520
9	3 57 55.44	2.1992	24 5 37.7	4.221	9	5 43 26.55	2.1800	25 7 7.6	1.639
10	4 0 7.41	2.1998	24 9 47.3	4.099	10	5 45 37.31	2.1785	25 5 25.7	1.758
11	4 2 19.42	2.2004	24 13 49.6	3.977	11	5 47 47.97	2.1769	25 3 36.7	1.877
12	4 4 31.46	2.2009	24 17 44.6	3.856	12	5 49 58.54	2.1753	25 1 40.5	1.996
13	4 6 43.53	2.2015	24 21 32.3	3.733	13	5 52 9.01	2.1737	24 59 37.2	2.113
14	4 8 55.64	2.2020	24 25 12.6	3.612	14	5 54 19.39	2.1721	24 57 26.9	2.231
15	4 11 7.77	2.2023	24 28 45.7	3.490	15	5 56 29.66	2.1703	24 55 9.5	2.349
16	4 13 19.92	2.2028	24 32 11.4	3.367	16	5 58 39.83	2.1686	24 52 45.0	2.466
17	4 15 32.10	2.2032	24 35 29.7	3.244	17	6 0 49.89	2.1668	24 50 13.6	2.583
18	4 17 44.30	2.2034	24 38 40.7	3.122	18	6 2 59.85	2.1650	24 47 35.1	2.700
19	4 19 56.51	2.2037	24 41 44.3	2.998	19	6 5 9.69	2.1631	24 44 49.6	2.816
20	4 22 8.74	2.2039	24 44 40.5	2.876	20	6 7 19.42	2.1612	24 41 57.2	2.931
21	4 24 20.98	2.2041	24 47 29.4	2.753	21	6 9 29.04	2.1593	24 38 57.9	3.047
22	4 26 33.23	2.2042	24 50 10.9	2.630	22	6 11 38.54	2.1574	24 35 51.6	3.162
23	4 28 45.49	2.2043	24 52 45.0	2.507	23	6 13 47.93	2.1554	24 32 38.4	3.277
24	4 30 57.75	2.2044	N.24 55 11.8	2.385	24	6 15 57.19	2.1533	N.24 29 18.4	3.391

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 9.					SUNDAY 11.				
0	h m s	s	N. 24 29 18.4	3.391	0	h m s	s	N. 19 43 23.2	8.324
1	6 15 57.19	2.1533	24 25 51.5	3.505	1	7 58 34.40	2.0307	19 35 1.1	8.413
2	6 18 6.33	2.1512	24 22 17.8	3.618	2	8 0 36.17	2.0282	19 26 33.7	8.501
3	6 20 15.34	2.1492	24 18 37.3	3.732	3	8 2 37.78	2.0256	19 18 1.0	8.589
4	6 22 24.23	2.1471	24 14 50.0	3.844	4	8 4 39.24	2.0231	19 9 23.0	8.677
5	6 24 32.99	2.1449	24 10 56.0	3.957	5	8 6 40.55	2.0205	19 0 39.8	8.765
6	6 26 41.62	2.1427	24 6 55.2	4.069	6	8 8 41.70	2.0179	18 51 51.4	8.850
7	6 28 50.12	2.1405	24 2 47.7	4.180	7	8 10 42.70	2.0154	18 42 57.8	8.935
8	6 30 58.48	2.1382	23 58 33.6	4.291	8	8 12 43.55	2.0129	18 33 59.2	9.019
9	6 33 6.71	2.1360	23 54 12.8	4.402	9	8 14 44.25	2.0104	18 24 55.5	9.104
10	6 35 14.80	2.1337	23 49 45.3	4.512	10	8 16 44.80	2.0080	18 15 46.7	9.187
11	6 37 22.75	2.1315	23 45 11.3	4.622	11	8 18 45.21	2.0056	18 6 33.0	9.269
12	6 39 30.56	2.1293	23 40 30.6	4.732	12	8 20 45.47	2.0031	17 57 14.4	9.352
13	6 41 38.22	2.1269	23 35 43.4	4.840	13	8 22 45.58	2.0007	17 47 50.8	9.433
14	6 43 45.75	2.1242	23 30 49.8	4.948	14	8 24 45.55	1.9983	17 38 22.4	9.514
15	6 45 53.13	2.1218	23 25 49.6	5.057	15	8 26 45.38	1.9959	17 28 49.1	9.595
16	6 48 0.37	2.1194	23 20 42.9	5.165	16	8 28 45.07	1.9936	17 19 11.0	9.674
17	6 50 7.46	2.1169	23 15 29.8	5.272	17	8 30 44.61	1.9913	17 9 28.2	9.753
18	6 52 14.40	2.1145	23 10 10.3	5.378	18	8 32 44.02	1.9890	16 59 40.6	9.832
19	6 54 21.20	2.1120	23 4 44.5	5.483	19	8 34 43.29	1.9867	16 49 48.4	9.908
20	6 56 27.84	2.1094	22 59 12.3	5.590	20	8 36 42.42	1.9844	16 39 51.6	9.986
21	6 58 34.33	2.1069	22 53 33.7	5.695	21	8 38 41.42	1.9822	16 29 50.1	10.062
22	7 0 40.67	2.1044	22 47 48.9	5.799	22	8 40 40.29	1.9800	16 19 44.1	10.138
23	7 2 46.86	2.1019	N. 22 41 57.8	5.903	23	8 42 39.02	1.9778	N. 16 9 33.5	10.213
24	7 4 52.90	2.0993							
SATURDAY 10.					MONDAY 12.				
0	7 6 58.78	2.0968	N. 22 36 0.5	6.007	0	8 44 37.62	1.9757	N. 15 59 18.5	10.287
1	7 9 4.51	2.0942	22 29 57.0	6.109	1	8 46 36.10	1.9736	15 48 59.1	10.360
2	7 11 10.08	2.0915	22 23 47.4	6.212	2	8 48 34.45	1.9715	15 38 35.3	10.433
3	7 13 15.49	2.0889	22 17 31.6	6.314	3	8 50 32.68	1.9695	15 28 7.1	10.506
4	7 15 20.75	2.0863	22 11 9.7	6.416	4	8 52 30.79	1.9674	15 17 34.6	10.577
5	7 17 25.85	2.0837	22 4 41.7	6.517	5	8 54 28.77	1.9654	15 6 57.8	10.648
6	7 19 30.79	2.0810	21 58 7.7	6.616	6	8 56 26.64	1.9633	14 56 16.8	10.718
7	7 21 35.57	2.0783	21 51 27.8	6.715	7	8 58 24.39	1.9616	14 45 31.6	10.787
8	7 23 40.19	2.0757	21 44 41.9	6.815	8	9 0 22.03	1.9597	14 34 42.3	10.856
9	7 25 44.65	2.0731	21 37 50.0	6.914	9	9 2 19.55	1.9578	14 23 48.9	10.924
10	7 27 48.96	2.0704	21 30 52.2	7.012	10	9 4 16.97	1.9560	14 12 51.4	10.991
11	7 29 53.10	2.0678	21 23 48.6	7.109	11	9 6 14.27	1.9542	14 1 50.0	11.058
12	7 31 57.09	2.0652	21 16 39.1	7.207	12	9 8 11.47	1.9523	13 50 44.5	11.124
13	7 34 0.92	2.0624	21 9 23.8	7.303	13	9 10 8.57	1.9507	13 39 35.1	11.188
14	7 36 4.58	2.0598	21 2 2.8	7.398	14	9 12 5.56	1.9490	13 28 21.9	11.253
15	7 38 8.09	2.0571	20 54 36.0	7.493	15	9 14 2.45	1.9474	13 17 4.8	11.317
16	7 40 11.43	2.0544	20 47 3.6	7.588	16	9 15 59.25	1.9458	13 5 43.9	11.380
17	7 42 14.62	2.0518	20 39 25.5	7.682	17	9 17 55.95	1.9442	12 54 19.2	11.442
18	7 44 17.65	2.0491	20 31 41.7	7.776	18	9 19 52.56	1.9427	12 42 50.9	11.504
19	7 46 20.51	2.0464	20 23 52.4	7.868	19	9 21 49.07	1.9412	12 31 18.9	11.564
20	7 48 23.22	2.0438	20 15 57.5	7.961	20	9 23 45.50	1.9398	12 19 43.2	11.624
21	7 50 25.77	2.0412	20 7 57.1	8.052	21	9 25 41.85	1.9384	12 8 4.0	11.683
22	7 52 28.16	2.0386	19 59 51.3	8.143	22	9 27 38.11	1.9370	11 56 21.2	11.741
23	7 54 30.40	2.0360	19 51 40.0	8.234	23	9 29 34.29	1.9357	11 44 34.9	11.800
24	7 56 32.48	2.0333	N. 19 43 23.2	8.324	24	9 31 30.39	1.9344	N. 11 32 45.2	11.857



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 13.					THURSDAY 15.				
0	9 31 30.39	1.9344	N. 11 32 45.2	11.857	0	11 3 47.91	1.9313	N. 1 13 5.1	13.637
1	9 33 26.42	1.9332	11 20 52.1	11.913	1	11 5 43.83	1.9326	0 59 26.4	13.652
2	9 35 22.37	1.9319	11 8 55.7	11.968	2	11 7 39.82	1.9339	0 45 46.8	13.667
3	9 37 18.25	1.9306	10 56 56.0	12.023	3	11 9 35.90	1.9353	0 32 6.3	13.682
4	9 39 14.07	1.9297	10 44 52.9	12.077	4	11 11 32.06	1.9368	0 18 25.0	13.694
5	9 41 9.82	1.9287	10 32 46.7	12.130	5	11 13 28.31	1.9383	N. 0 4 43.0	13.705
6	9 43 5.51	1.9277	10 20 37.3	12.182	6	11 15 24.66	1.9399	S. 0 8 59.6	13.715
7	9 45 1.14	1.9267	10 8 24.8	12.234	7	11 17 21.10	1.9416	0 22 42.8	13.724
8	9 46 56.72	1.9258	9 56 9.2	12.285	8	11 19 17.65	1.9433	0 36 26.5	13.733
9	9 48 52.24	1.9249	9 43 50.6	12.335	9	11 21 14.30	1.9451	0 50 10.8	13.742
10	9 50 47.71	1.9241	9 31 29.0	12.384	10	11 23 11.06	1.9469	1 3 55.5	13.748
11	9 52 43.13	1.9233	9 19 4.5	12.433	11	11 25 7.93	1.9488	1 17 40.5	13.752
12	9 54 38.50	1.9225	9 6 37.0	12.482	12	11 27 4.91	1.9507	1 31 25.8	13.757
13	9 56 33.83	1.9218	8 54 6.7	12.532	13	11 29 2.01	1.9527	1 45 11.4	13.761
14	9 58 29.12	1.9212	8 41 33.6	12.574	14	11 30 59.24	1.9548	1 58 57.1	13.765
15	10 0 24.38	1.9207	8 28 57.8	12.619	15	11 32 56.59	1.9569	2 12 42.9	13.764
16	10 2 19.61	1.9202	8 16 19.3	12.664	16	11 34 54.07	1.9591	2 26 28.8	13.765
17	10 4 14.80	1.9197	8 3 38.1	12.707	17	11 36 51.68	1.9613	2 40 14.7	13.764
18	10 6 9.97	1.9192	7 50 54.4	12.750	18	11 38 49.43	1.9637	2 54 0.5	13.763
19	10 8 5.11	1.9188	7 38 8.1	12.792	19	11 40 47.32	1.9661	3 7 46.2	13.760
20	10 10 0.23	1.9185	7 25 19.3	12.834	20	11 42 45.36	1.9685	3 21 31.7	13.756
21	10 11 55.33	1.9182	7 12 28.0	12.875	21	11 44 43.54	1.9709	3 35 16.9	13.750
22	10 13 50.42	1.9180	6 59 34.3	12.914	22	11 46 41.87	1.9735	3 49 1.7	13.744
23	10 15 45.49	1.9178	N. 6 46 38.3	12.953	23	11 48 40.36	1.9762	S. 4 2 46.2	13.737
WEDNESDAY 14.					FRIDAY 16.				
0	10 17 40.55	1.9177	N. 6 33 39.9	12.992	0	11 50 39.01	1.9788	S. 4 16 30.1	13.728
1	10 19 35.61	1.9176	6 20 39.3	13.028	1	11 52 37.82	1.9816	4 30 13.5	13.718
2	10 21 30.66	1.9176	6 7 36.5	13.064	2	11 54 36.80	1.9844	4 43 56.3	13.708
3	10 23 25.72	1.9177	5 54 31.6	13.099	3	11 56 35.95	1.9873	4 57 38.5	13.697
4	10 25 20.78	1.9178	5 41 24.6	13.134	4	11 58 35.27	1.9902	5 11 20.0	13.684
5	10 27 15.85	1.9179	5 28 15.5	13.168	5	12 0 34.77	1.9932	5 25 0.6	13.669
6	10 29 10.93	1.9181	5 15 4.4	13.201	6	12 2 34.45	1.9962	5 38 40.3	13.654
7	10 31 6.02	1.9183	5 1 51.4	13.232	7	12 4 34.31	1.9992	5 52 19.1	13.638
8	10 33 1.13	1.9187	4 48 36.5	13.263	8	12 6 34.36	2.0024	6 5 56.9	13.622
9	10 34 56.26	1.9190	4 35 19.8	13.294	9	12 8 34.60	2.0057	6 19 33.7	13.603
10	10 36 51.41	1.9194	4 22 1.2	13.323	10	12 10 35.04	2.0090	6 33 9.3	13.583
11	10 38 46.59	1.9199	4 8 41.0	13.351	11	12 12 35.68	2.0123	6 46 43.7	13.562
12	10 40 41.80	1.9204	3 55 19.1	13.378	12	12 14 36.52	2.0157	7 0 16.7	13.539
13	10 42 37.04	1.9210	3 41 55.6	13.405	13	12 16 37.57	2.0192	7 13 48.4	13.517
14	10 44 32.32	1.9217	3 28 30.5	13.432	14	12 18 38.83	2.0227	7 27 18.7	13.493
15	10 46 27.64	1.9224	3 15 3.8	13.457	15	12 20 40.30	2.0263	7 40 47.5	13.467
16	10 48 23.01	1.9232	3 1 35.7	13.480	16	12 22 41.99	2.0300	7 54 14.7	13.439
17	10 50 18.42	1.9239	2 48 6.2	13.502	17	12 24 43.90	2.0337	8 7 40.2	13.411
18	10 52 13.88	1.9248	2 34 35.4	13.524	18	12 26 46.03	2.0374	8 21 4.0	13.382
19	10 54 9.40	1.9257	2 21 3.3	13.546	19	12 28 48.39	2.0412	8 34 26.0	13.352
20	10 56 4.97	1.9267	2 7 29.9	13.566	20	12 30 50.98	2.0452	8 47 46.2	13.321
21	10 58 0.60	1.9278	1 53 55.4	13.585	21	12 32 53.81	2.0491	9 1 4.5	13.287
22	10 59 56.30	1.9289	1 40 19.7	13.604	22	12 34 56.87	2.0530	9 14 20.7	13.252
23	11 1 52.07	1.9301	1 26 42.9	13.622	23	12 37 0.17	2.0570	9 27 34.8	13.217
24	11 3 47.91	1.9313	N. 1 13 5.1	13.637	24	12 39 3.71	2.0611	S. 9 40 46.8	13.181

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 17.					MONDAY 19.				
0	12 39 3.71	2.0611	S. 9 40 46.8	13.181	0	14 23 37.26	2.3090	S. 19 5 56.0	9.838
1	12 41 7.50	2.0653	9 53 56.5	13.143	1	14 25 55.97	2.3148	19 15 43.2	9.734
2	12 43 11.55	2.0696	10 7 3.9	13.103	2	14 28 15.03	2.3206	19 25 24.1	9.629
3	12 45 15.85	2.0738	10 20 8.9	13.063	3	14 30 34.44	2.3263	19 34 58.7	9.522
4	12 47 20.40	2.0781	10 33 11.5	13.022	4	14 32 54.19	2.3321	19 44 26.8	9.414
5	12 49 25.22	2.0825	10 46 11.5	12.978	5	14 35 14.29	2.3378	19 53 48.4	9.304
6	12 51 30.30	2.0869	10 59 8.9	12.933	6	14 37 34.73	2.3435	20 3 3.3	9.193
7	12 53 35.65	2.0914	11 12 3.5	12.888	7	14 39 55.51	2.3492	20 12 11.6	9.082
8	12 55 41.27	2.0959	11 24 55.4	12.841	8	14 42 16.64	2.3550	20 21 13.1	8.968
9	12 57 47.16	2.1005	11 37 44.4	12.792	9	14 44 38.11	2.3607	20 30 7.8	8.853
10	12 59 53.33	2.1052	11 50 30.5	12.742	10	14 46 59.92	2.3664	20 38 55.5	8.737
11	13 1 59.78	2.1098	12 3 13.5	12.692	11	14 49 22.08	2.3721	20 47 36.2	8.629
12	13 4 6.51	2.1146	12 15 53.5	12.640	12	14 51 44.57	2.3777	20 56 9.8	8.500
13	13 6 13.53	2.1193	12 28 30.3	12.586	13	14 54 7.40	2.3832	21 4 36.2	8.379
14	13 8 20.83	2.1242	12 41 3.8	12.531	14	14 56 30.56	2.3888	21 12 55.3	8.258
15	13 10 28.43	2.1291	12 53 34.0	12.474	15	14 58 54.06	2.3944	21 21 7.1	8.135
16	13 12 36.32	2.1339	13 6 0.7	12.417	16	15 1 17.89	2.3999	21 29 11.5	8.010
17	13 14 44.50	2.1388	13 18 24.0	12.358	17	15 3 42.05	2.4054	21 37 8.3	7.884
18	13 16 52.98	2.1439	13 30 43.7	12.297	18	15 6 6.54	2.4108	21 44 57.6	7.757
19	13 19 1.77	2.1490	13 42 59.7	12.236	19	15 8 31.35	2.4163	21 52 39.2	7.629
20	13 21 10.86	2.1541	13 55 12.0	12.172	20	15 10 56.49	2.4217	22 0 13.1	7.499
21	13 23 20.26	2.1592	14 7 20.4	12.107	21	15 13 21.95	2.4269	22 7 39.1	7.368
22	13 25 29.97	2.1644	14 19 24.9	12.042	22	15 15 47.72	2.4322	22 14 57.3	7.237
23	13 27 39.99	2.1696	S. 14 31 25.5	11.975	23	15 18 13.81	2.4375	S. 22 22 7.5	7.103
SUNDAY 18.					TUESDAY 20.				
0	13 29 50.32	2.1748	S. 14 43 21.9	11.906	0	15 20 40.22	2.4427	S. 22 29 9.7	6.969
1	13 32 0.97	2.1802	14 55 14.2	11.837	1	15 23 6.94	2.4478	22 36 3.8	6.832
2	13 34 11.94	2.1855	15 7 2.3	11.766	2	15 25 33.96	2.4529	22 42 49.6	6.695
3	13 36 23.23	2.1908	15 18 46.1	11.692	3	15 28 1.29	2.4580	22 49 27.2	6.557
4	13 38 34.84	2.1962	15 30 25.4	11.617	4	15 30 28.92	2.4629	22 55 56.5	6.418
5	13 40 46.78	2.2017	15 42 0.2	11.542	5	15 32 56.84	2.4678	23 2 17.4	6.277
6	13 42 59.04	2.2071	15 53 30.5	11.466	6	15 35 25.06	2.4727	23 8 29.8	6.136
7	13 45 11.63	2.2126	16 4 56.1	11.388	7	15 37 53.56	2.4774	23 14 33.7	5.992
8	13 47 24.55	2.2181	16 16 17.0	11.308	8	15 40 22.35	2.4822	23 20 28.9	5.848
9	13 49 37.80	2.2237	16 27 33.1	11.227	9	15 42 51.42	2.4868	23 26 15.5	5.704
10	13 51 51.39	2.2293	16 38 44.2	11.143	10	15 45 20.77	2.4913	23 31 53.4	5.558
11	13 54 5.31	2.2348	16 49 50.3	11.059	11	15 47 50.38	2.4958	23 37 22.5	5.411
12	13 56 19.57	2.2404	17 0 51.3	10.973	12	15 50 20.26	2.5002	23 42 42.7	5.262
13	13 58 34.16	2.2461	17 11 47.1	10.887	13	15 52 50.41	2.5046	23 47 54.0	5.113
14	14 0 49.10	2.2517	17 22 37.7	10.799	14	15 55 20.81	2.5088	23 52 56.3	4.962
15	14 3 4.37	2.2573	17 33 23.0	10.709	15	15 57 51.47	2.5130	23 57 49.5	4.812
16	14 5 19.98	2.2630	17 44 2.8	10.618	16	16 0 22.37	2.5170	24 2 33.7	4.660
17	14 7 35.93	2.2687	17 54 37.2	10.526	17	16 2 53.51	2.5210	24 7 8.7	4.507
18	14 9 52.23	2.2745	18 5 5.9	10.431	18	16 5 24.89	2.5249	24 11 34.5	4.352
19	14 12 8.87	2.2802	18 15 28.9	10.336	19	16 7 56.50	2.5287	24 15 51.0	4.197
20	14 14 25.86	2.2860	18 25 46.2	10.239	20	16 10 28.34	2.5324	24 19 58.2	4.042
21	14 16 43.19	2.2917	18 35 57.6	10.141	21	16 13 0.39	2.5360	24 23 56.0	3.885
22	14 19 0.87	2.2975	18 46 3.1	10.042	22	16 15 32.66	2.5396	24 27 44.4	3.728
23	14 21 18.89	2.3033	18 56 2.6	9.941	23	16 18 5.14	2.5429	24 31 23.4	3.570
24	14 23 37.26	2.3090	S. 19 5 56.0	9.838	24	16 20 37.81	2.5462	S. 24 34 52.8	3.411

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 21.					FRIDAY 23.				
0	h m s		S. 24 34 52.8	3.411	0	h m s		S. 24 7 22.3	4.576
1	16 20 37.81	2.5462	24 38 12.7	3.851	1	18 24 26.35	2.5657	24 2 42.9	4.737
2	16 23 10.68	2.5495	24 41 22.9	3.090	2	18 27 0.22	2.5633	23 57 53.8	4.898
3	16 25 43.75	2.5527	24 44 23.5	2.929	3	18 29 33.94	2.5607	23 52 55.1	5.058
4	16 28 17.00	2.5556	24 47 14.4	2.767	4	18 32 7.50	2.5579	23 47 46.8	5.217
5	16 30 50.42	2.5584	24 49 55.5	2.604	5	18 34 40.89	2.5551	23 42 29.0	5.376
6	16 33 24.01	2.5612	24 52 26.9	2.442	6	18 37 14.11	2.5522	23 37 1.7	5.533
7	16 35 57.76	2.5638	24 54 48.5	2.278	7	18 39 47.16	2.5493	23 31 25.0	5.690
8	16 38 31.67	2.5664	24 57 0.3	2.114	8	18 42 20.03	2.5463	23 25 38.9	5.847
9	16 41 5.73	2.5688	24 59 2.2	1.948	9	18 44 52.72	2.5432	23 19 43.4	6.002
10	16 43 39.93	2.5711	25 0 54.1	1.783	10	18 47 25.21	2.5398	23 13 38.7	6.156
11	16 46 14.26	2.5733	25 2 36.1	1.618	11	18 49 57.50	2.5365	23 7 24.7	6.310
12	16 48 48.73	2.5754	25 4 8.2	1.452	12	18 52 29.59	2.5332	23 1 1.5	6.462
13	16 51 23.31	2.5773	25 5 30.3	1.285	13	18 55 1.48	2.5297	22 54 29.2	6.613
14	16 53 58.01	2.5792	25 6 42.4	1.117	14	18 57 33.15	2.5260	22 47 47.9	6.763
15	16 56 32.82	2.5809	25 7 44.4	0.949	15	19 0 4.60	2.5224	22 40 57.6	6.912
16	16 59 7.72	2.5825	25 8 36.3	0.782	16	19 2 35.84	2.5187	22 33 58.4	7.061
17	17 1 42.72	2.5840	25 9 18.2	0.614	17	19 5 6.85	2.5149	22 26 50.3	7.208
18	17 4 17.80	2.5853	25 9 50.0	0.446	18	19 7 37.63	2.5111	22 19 33.4	7.355
19	17 6 52.96	2.5865	25 10 11.7	0.277	19	19 10 8.18	2.5072	22 12 7.7	7.501
20	17 9 28.18	2.5876	25 10 23.3	-0.108	20	19 12 38.49	2.5032	22 4 33.3	7.645
21	17 12 3.47	2.5887	25 10 24.7	+0.061	21	19 15 8.56	2.4991	21 56 50.3	7.787
22	17 14 38.82	2.5895	25 10 16.0	0.229	22	19 17 38.38	2.4950	21 48 58.8	7.929
23	17 17 14.21	2.5902	S. 25 9 57.2	0.398	23	19 20 7.96	2.4908	S. 21 40 58.8	8.071
24	17 19 49.64	2.5907				19 22 37.28	2.4865		
THURSDAY 22.					SATURDAY 24.				
0	h m s		S. 25 9 28.2	0.568	0	h m s		S. 21 32 50.3	8.210
1	17 22 25.10	2.5912	25 8 49.0	0.737	1	19 25 6.34	2.4822	21 24 33.6	8.348
2	17 25 0.59	2.5916	25 7 59.7	0.907	2	19 27 35.15	2.4779	21 16 8.6	8.485
3	17 27 36.09	2.5918	25 7 0.2	1.076	3	19 30 3.69	2.4735	21 7 35.4	8.621
4	17 30 11.60	2.5918	25 5 50.6	1.245	4	19 32 31.97	2.4691	20 58 54.1	8.755
5	17 32 47.11	2.5918	25 4 30.8	1.415	5	19 34 59.98	2.4647	20 50 4.8	8.888
6	17 35 22.62	2.5917	25 3 0.8	1.584	6	19 37 27.73	2.4602	20 41 7.5	9.021
7	17 37 58.11	2.5913	25 1 20.7	1.753	7	19 39 55.21	2.4557	20 32 2.3	9.151
8	17 40 33.58	2.5909	24 59 30.5	1.922	8	19 42 22.41	2.4510	20 22 49.4	9.280
9	17 43 9.02	2.5904	24 57 30.1	2.091	9	19 44 49.33	2.4463	20 13 28.7	9.408
10	17 45 44.43	2.5898	24 55 19.6	2.259	10	19 47 15.97	2.4418	20 4 0.4	9.535
11	17 48 19.80	2.5890	24 52 59.0	2.427	11	19 49 42.34	2.4372	19 54 24.5	9.661
12	17 50 55.11	2.5881	24 50 28.3	2.595	12	19 52 8.43	2.4327	19 44 41.1	9.785
13	17 53 30.37	2.5871	24 47 47.6	2.762	13	19 54 34.23	2.4277	19 34 50.3	9.907
14	17 56 5.56	2.5859	24 44 56.8	2.930	14	19 56 59.75	2.4229	19 24 52.2	10.028
15	17 58 40.68	2.5847	24 41 56.0	3.097	15	19 59 24.98	2.4181	19 14 46.9	10.148
16	18 1 15.72	2.5833	24 38 45.2	3.263	16	20 1 49.92	2.4133	19 4 34.4	10.267
17	18 3 50.67	2.5818	24 35 24.4	3.429	17	20 4 14.58	2.4086	18 54 14.9	10.384
18	18 6 25.53	2.5802	24 31 53.7	3.594	18	20 6 38.95	2.4037	18 43 48.4	10.500
19	18 9 0.29	2.5784	24 28 13.1	3.759	19	20 9 3.03	2.3988	18 33 14.9	10.614
20	18 11 34.94	2.5765	24 24 22.6	3.924	20	20 11 26.81	2.3940	18 22 34.7	10.729
21	18 14 9.47	2.5746	24 20 22.2	4.088	21	20 13 50.31	2.3892	18 11 47.8	10.837
22	18 16 43.89	2.5726	24 16 12.0	4.252	22	20 16 13.52	2.3844	18 0 54.2	10.947
23	18 19 18.18	2.5703	24 11 52.0	4.414	23	20 18 36.44	2.3795	17 49 54.1	11.056
24	18 21 52.33	2.5681	S. 24 7 22.3	4.576	24	20 20 59.07	2.3747		
	18 24 26.35	2.5657				20 23 21.41	2.3699	S. 17 38 47.5	11.163

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 25.					TUESDAY 27.				
0	20 23 21.41	2.3699	S. 17 38 47.5	11.163	0	22 11 57.36	2.1700	S. 7 8 44.8	14.496
1	20 25 43.46	2.3650	17 27 34.5	11.268	1	22 14 7.47	2.1669	6 54 14.1	14.538
2	20 28 5.21	2.3602	17 16 15.3	11.372	2	22 16 17.39	2.1639	6 39 41.5	14.558
3	20 30 26.68	2.3553	17 4 49.8	11.475	3	22 18 27.14	2.1610	6 25 7.1	14.587
4	20 32 47.85	2.3505	16 53 18.3	11.575	4	22 20 36.71	2.1582	6 10 31.0	14.615
5	20 35 8.74	2.3457	16 41 40.8	11.675	5	22 22 46.12	2.1554	5 55 53.3	14.640
6	20 37 29.34	2.3409	16 29 57.3	11.773	6	22 24 55.36	2.1527	5 41 14.2	14.664
7	20 39 49.65	2.3362	16 18 8.0	11.870	7	22 27 4.44	2.1500	5 26 33.6	14.687
8	20 42 9.68	2.3314	16 6 12.9	11.965	8	22 29 13.36	2.1474	5 11 51.7	14.708
9	20 44 29.42	2.3267	15 54 12.2	12.058	9	22 31 22.13	2.1448	4 57 8.6	14.728
10	20 46 48.88	2.3219	15 42 5.9	12.150	10	22 33 30.74	2.1423	4 42 24.3	14.747
11	20 49 8.05	2.3172	15 29 54.2	12.240	11	22 35 39.21	2.1399	4 27 38.9	14.764
12	20 51 26.94	2.3125	15 17 37.1	12.329	12	22 37 47.53	2.1375	4 12 52.6	14.779
13	20 53 45.55	2.3078	15 5 14.7	12.416	13	22 39 55.71	2.1352	3 58 5.4	14.793
14	20 56 3.88	2.3032	14 52 47.2	12.502	14	22 42 3.76	2.1330	3 43 17.4	14.806
15	20 58 21.94	2.2987	14 40 14.5	12.587	15	22 44 11.67	2.1308	3 28 28.7	14.817
16	21 0 39.72	2.2941	14 27 36.8	12.669	16	22 46 19.46	2.1287	3 13 39.4	14.826
17	21 2 57.23	2.2896	14 14 54.2	12.750	17	22 48 27.12	2.1267	2 58 49.6	14.834
18	21 5 14.47	2.2850	14 2 6.8	12.829	18	22 50 34.66	2.1247	2 43 59.3	14.842
19	21 7 31.43	2.2805	13 49 14.7	12.907	19	22 52 42.08	2.1228	2 29 8.6	14.847
20	21 9 48.13	2.2761	13 36 17.9	12.984	20	22 54 49.39	2.1209	2 14 17.7	14.850
21	21 12 4.56	2.2717	13 23 16.6	13.059	21	22 56 56.59	2.1191	1 59 26.6	14.852
22	21 14 20.73	2.2673	13 10 10.8	13.132	22	22 59 3.68	2.1173	1 44 35.4	14.853
23	21 16 36.64	2.2630	S. 12 57 0.7	13.204	23	23 1 10.66	2.1156	S. 1 29 44.2	14.853
MONDAY 26.					WEDNESDAY 28.				
0	21 18 52.29	2.2587	S. 12 43 46.3	13.274	0	23 3 17.55	2.1140	S. 1 14 53.0	14.852
1	21 21 7.68	2.2544	12 30 27.8	13.343	1	23 5 24.34	2.1124	1 0 2.0	14.848
2	21 23 22.82	2.2502	12 17 5.2	13.410	2	23 7 31.04	2.1109	0 45 11.2	14.844
3	21 25 37.71	2.2461	12 3 38.6	13.475	3	23 9 37.65	2.1095	0 30 20.7	14.837
4	21 27 52.35	2.2420	11 50 8.2	13.539	4	23 11 44.18	2.1082	0 15 30.7	14.830
5	21 30 6.75	2.2379	11 36 33.9	13.602	5	23 13 50.63	2.1068	S. 0 0 41.1	14.822
6	21 32 20.90	2.2338	11 22 55.9	13.663	6	23 15 57.00	2.1056	N. 0 14 7.9	14.811
7	21 34 34.81	2.2298	11 9 14.3	13.722	7	23 18 3.30	2.1043	0 28 56.2	14.799
8	21 36 48.48	2.2259	10 55 29.2	13.780	8	23 20 9.52	2.1032	0 43 43.8	14.787
9	21 39 1.92	2.2220	10 41 40.7	13.836	9	23 22 15.68	2.1022	0 58 30.6	14.773
10	21 41 15.12	2.2181	10 27 48.9	13.891	10	23 24 21.78	2.1011	1 13 16.5	14.757
11	21 43 28.09	2.2143	10 13 53.8	13.945	11	23 26 27.81	2.1001	1 28 1.4	14.740
12	21 45 40.84	2.2107	9 59 55.5	13.997	12	23 28 33.79	2.0992	1 42 45.3	14.722
13	21 47 53.37	2.2069	9 45 54.2	14.046	13	23 30 39.72	2.0984	1 57 28.1	14.702
14	21 50 5.67	2.2032	9 31 50.0	14.094	14	23 32 45.60	2.0976	2 12 9.6	14.681
15	21 52 17.76	2.1997	9 17 42.9	14.142	15	23 34 51.43	2.0968	2 26 49.8	14.658
16	21 54 29.64	2.1962	9 3 33.0	14.188	16	23 36 57.22	2.0962	2 41 28.6	14.635
17	21 56 41.30	2.1928	8 49 20.4	14.232	17	23 39 2.97	2.0956	2 56 6.0	14.610
18	21 58 52.76	2.1893	8 35 5.2	14.273	18	23 41 8.69	2.0951	3 10 41.8	14.583
19	22 1 4.02	2.1859	8 20 47.6	14.314	19	23 43 14.38	2.0946	3 25 16.0	14.557
20	22 3 15.07	2.1826	8 6 27.5	14.354	20	23 45 20.04	2.0941	3 39 48.6	14.528
21	22 5 25.93	2.1794	7 52 5.1	14.392	21	23 47 25.67	2.0937	3 54 19.4	14.498
22	22 7 36.60	2.1762	7 37 40.4	14.429	22	23 49 31.28	2.0934	4 8 48.3	14.466
23	22 9 47.07	2.1730	7 23 13.6	14.463	23	23 51 36.88	2.0932	4 23 15.3	14.433
24	22 11 57.36	2.1700	S. 7 8 44.8	14.496	24	23 53 42.46	2.0929	N. 4 37 40.3	14.399

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 29.					SATURDAY, OCTOBER 1.				
0	h m s	s	N. ° ' "	"	0	h m s	s	N. ° ' "	"
1	23 53 42.46	2.0929	4 37 40.3	14.399	1	34 48.28	2.1343	15 7 2.5	11.402
2	23 55 48.03	2.0927	4 52 3.2	14.363	PHASES OF THE MOON.				
3	23 57 53.59	2.0926	5 6 23.9	14.327					
4	23 59 59.14	2.0925	5 20 42.4	14.289					
5	0 2 4.69	2.0925	5 34 58.6	14.250					
6	0 4 10.24	2.0926	5 49 12.4	14.210					
7	0 6 15.80	2.0927	6 3 23.8	14.169					
8	0 8 21.36	2.0928	6 17 32.7	14.126					
9	0 10 26.93	2.0930	6 31 38.9	14.082					
10	0 12 32.52	2.0932	6 45 42.5	14.037					
11	0 14 38.12	2.0935	6 59 43.3	13.990					
12	0 16 43.74	2.0938	7 13 41.3	13.942	PHASES OF THE MOON.				
13	0 18 49.38	2.0942	7 27 36.4	13.893					
14	0 20 55.05	2.0947	7 41 28.5	13.843					
15	0 23 0.75	2.0952	7 55 17.6	13.792					
16	0 25 6.47	2.0957	8 9 3.6	13.740					
17	0 27 12.23	2.0963	8 22 46.4	13.687					
18	0 29 18.03	2.0970	8 36 26.0	13.633					
19	0 31 23.87	2.0977	8 50 2.3	13.576					
20	0 33 29.75	2.0983	9 3 35.1	13.519					
21	0 35 35.67	2.0991	9 17 4.5	13.462					
22	0 37 41.64	2.0998	9 30 30.5	13.402	PHASES OF THE MOON.				
23	0 39 47.65	2.1007	9 43 52.8	13.341					
24	0 41 53.72	2.1016	N. 9 57 11.4	13.279					
FRIDAY 30.									
0	0 43 59.84	2.1025	N. 10 10 26.3	13.217	PHASES OF THE MOON.				
1	0 46 6.02	2.1034	10 23 37.4	13.153					
2	0 48 12.25	2.1044	10 36 44.7	13.088					
3	0 50 18.55	2.1055	10 49 48.0	13.022					
4	0 52 24.91	2.1066	11 2 47.4	12.956					
5	0 54 31.34	2.1077	11 15 42.7	12.888					
6	0 56 37.83	2.1088	11 28 34.0	12.819					
7	0 58 44.39	2.1099	11 41 21.0	12.748					
8	1 0 51.02	2.1112	11 54 3.8	12.677					
9	1 2 57.73	2.1124	12 6 42.3	12.606	PHASES OF THE MOON.				
10	1 5 4.51	2.1137	12 19 16.5	12.533					
11	1 7 11.37	2.1149	12 31 46.2	12.458					
12	1 9 18.30	2.1163	12 44 11.4	12.383					
13	1 11 25.32	2.1177	12 56 32.1	12.307					
14	1 13 32.42	2.1190	13 8 48.2	12.229					
15	1 15 39.60	2.1204	13 20 59.6	12.151					
16	1 17 46.87	2.1219	13 33 6.3	12.072					
17	1 19 54.23	2.1233	13 45 8.2	11.991					
18	1 22 1.67	2.1248	13 57 5.2	11.909					
19	1 24 9.20	2.1263	14 8 57.3	11.827	PHASES OF THE MOON.				
20	1 26 16.83	2.1279	14 20 44.5	11.745					
21	1 28 24.55	2.1294	14 32 26.7	11.661					
22	1 30 32.36	2.1310	14 44 3.8	11.576					
23	1 32 40.27	2.1327	14 55 35.8	11.489					
24	1 34 48.28	2.1343	N. 15 7 2.5	11.402					

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	$\alpha$ Aquilæ W.	54 30 43	3174	55 57 23	3153	57 24 28	3136	58 51 54	3121
	$\alpha$ Arietis E.	44 18 25	2356	42 33 47	2372	40 49 32	2389	39 5 42	2407
	Aldebaran E.	77 4 11	2371	75 19 54	2385	73 35 58	2400	71 52 23	2416
	MARS E.	97 14 53	2512	95 33 57	2526	93 53 20	2541	92 13 4	2556
2	$\alpha$ Aquilæ W.	66 12 22	3088	67 40 46	3089	69 9 9	3091	70 37 30	3093
	Fomalhaut W.	41 53 35	3487	43 14 14	3437	44 35 49	3395	45 58 11	3359
	Aldebaran E.	63 20 11	2499	61 38 56	2517	59 58 6	2535	58 17 42	2553
	MARS E.	83 56 58	2635	82 18 50	2651	80 41 4	2668	79 3 41	2684
	Pollux E.	105 12 46	2472	103 30 54	2488	101 49 24	2503	100 8 15	2520
3	$\alpha$ Aquilæ W.	77 57 45	3129	79 25 19	3140	80 52 40	3152	82 19 47	3164
	Fomalhaut W.	52 58 22	3252	54 23 30	3240	55 48 52	3231	57 14 24	3225
	Aldebaran E.	50 2 15	2653	48 24 32	2674	46 47 17	2695	45 10 31	2718
	MARS E.	71 2 24	2770	69 27 17	2788	67 52 33	2805	66 18 12	2822
	Pollux E.	91 48 7	2601	90 9 13	2618	88 30 42	2634	86 52 33	2651
4	$\alpha$ Aquilæ W.	89 31 24	3236	90 56 50	3253	92 21 57	3270	93 46 44	3288
	Fomalhaut W.	64 23 12	3220	65 48 57	3223	67 14 39	3227	68 40 16	3232
	$\alpha$ Pegasi W.	41 59 50	3027	43 29 29	3024	44 59 12	3023	46 28 56	3023
	MARS E.	58 31 58	2907	56 59 48	2924	55 28 0	2941	53 56 33	2957
	Pollux E.	78 47 27	2735	77 11 33	2750	75 36 0	2767	74 0 49	2783
	SUN E.	129 12 25	3057	127 43 23	3073	126 14 41	3091	124 46 20	3106
5	Fomalhaut W.	75 46 36	3267	77 11 26	3276	78 36 6	3285	80 0 35	3294
	$\alpha$ Pegasi W.	53 56 59	3042	55 26 20	3048	56 55 33	3055	58 24 38	3061
	MARS E.	46 24 18	3035	44 54 49	3050	43 25 38	3064	41 56 44	3076
	Pollux E.	66 10 7	2862	64 37 0	2877	63 4 12	2892	61 31 43	2907
	SUN E.	117 29 26	3185	116 2 59	3201	114 36 51	3215	113 11 0	3231
6	Fomalhaut W.	87 0 11	3345	88 23 31	3356	89 46 38	3366	91 9 33	3377
	$\alpha$ Pegasi W.	65 47 55	3098	67 16 7	3105	68 44 11	3112	70 12 6	3119
	MARS E.	34 36 26	3143	33 9 9	3155	31 42 6	3167	30 15 17	3178
	Pollux E.	53 53 56	2978	52 23 16	2991	50 52 52	3005	49 22 45	3018
	SUN E.	106 5 54	3297	104 41 39	3309	103 17 38	3320	101 53 50	3332
7	Fomalhaut W.	98 0 59	3433	99 22 38	3446	100 44 3	3456	102 5 16	3469
	$\alpha$ Pegasi W.	77 29 30	3154	78 56 34	3160	80 23 31	3167	81 50 20	3172
	$\alpha$ Arietis W.	34 5 53	3057	35 34 55	3061	37 3 52	3065	38 32 44	3069
	Pollux E.	41 56 12	3082	40 27 41	3095	38 59 25	3108	37 31 25	3121
	SUN E.	94 57 58	3382	93 35 21	3391	92 12 54	3399	90 50 36	3406
8	$\alpha$ Pegasi W.	89 2 51	3197	90 29 4	3200	91 55 13	3204	93 21 17	3208
	$\alpha$ Arietis W.	45 55 59	3086	47 24 26	3087	48 52 51	3090	50 21 13	3091
	Regulus E.	66 36 31	3064	65 7 37	3069	63 38 49	3072	62 10 5	3076
	SUN E.	84 1 2	3437	82 39 27	3440	81 17 56	3445	79 56 30	3449
9	$\alpha$ Pegasi W.	100 30 41	3221	101 56 25	3224	103 22 6	3225	104 47 46	3226
	$\alpha$ Arietis W.	57 42 40	3095	59 10 56	3094	60 39 13	3093	62 7 31	3092
	Aldebaran W.	26 3 26	3322	27 27 12	3299	28 51 25	3278	30 16 2	3260
	Regulus E.	54 47 19	3087	53 18 53	3087	51 50 27	3087	50 22 1	3087
	SUN E.	73 10 10	3459	71 49 0	3459	70 27 50	3459	69 6 40	3459

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	<i>α</i> Aquilæ	W.	60 19 38	3110	61 47 36	3101	63 15 45	3095	64 44 1	3091
	<i>α</i> Arietis	E.	37 22 17	2425	35 39 18	2445	33 56 47	2465	32 14 44	2487
	Aldebaran	E.	70 9 11	2431	68 26 21	2448	66 43 54	2464	65 1 50	2482
	MARS	E.	90 33 8	2571	88 53 33	2587	87 14 20	2602	85 35 28	2613
2	<i>α</i> Aquilæ	W.	72 5 48	3098	73 34 0	3105	75 2 4	3111	76 30 0	3120
	Fomalhaut	W.	47 21 14	3329	48 44 52	3304	50 8 59	3283	51 33 30	3265
	Aldebaran	E.	56 37 43	2573	54 58 11	2592	53 19 5	2612	51 40 26	2632
	MARS	E.	77 26 40	2701	75 50 2	2718	74 13 46	2736	72 37 54	2753
	Pollux	E.	98 27 29	2535	96 47 5	2551	95 7 3	2568	93 27 24	2584
3	<i>α</i> Aquilæ	W.	83 46 39	3177	85 13 16	3191	86 39 36	3205	88 5 39	3220
	Fomalhaut	W.	58 40 4	3220	60 5 49	3219	61 31 36	3218	62 57 24	3218
	Aldebaran	E.	43 34 15	2741	41 58 29	2764	40 23 14	2788	38 48 31	2814
	MARS	E.	64 44 13	2839	63 10 36	2857	61 37 22	2873	60 4 29	2891
	Pollux	E.	85 14 47	2667	83 37 23	2684	82 0 22	2701	80 23 43	2718
4	<i>α</i> Aquilæ	W.	95 11 10	3306	96 35 15	3324	97 58 59	3344	99 22 20	3363
	Fomalhaut	W.	70 5 47	3238	71 31 11	3244	72 56 28	3252	74 21 36	3259
	<i>α</i> Pegasi	W.	47 58 40	3026	49 28 21	3028	50 57 59	3032	52 27 32	3037
	MARS	E.	52 25 26	2973	50 54 40	2989	49 24 13	3005	47 54 6	3020
	Pollux	E.	72 25 59	2799	70 51 30	2815	69 17 22	2831	67 43 34	2847
	SUN	E.	123 18 18	3123	121 50 36	3139	120 23 14	3155	118 56 11	3170
5	Fomalhaut	W.	81 24 53	3304	82 49 0	3314	84 12 55	3324	85 36 39	3334
	<i>α</i> Pegasi	W.	59 53 35	3069	61 22 23	3075	62 51 3	3083	64 19 33	3090
	MARS	E.	40 28 8	3091	38 59 48	3105	37 31 45	3119	36 3 58	3131
	Pollux	E.	59 59 33	2922	58 27 42	2936	56 56 9	2950	55 24 54	2964
	SUN	E.	111 45 27	3244	110 20 10	3258	108 55 9	3271	107 30 24	3284
6	Fomalhaut	W.	92 32 16	3388	93 54 46	3400	95 17 3	3411	96 39 7	3422
	<i>α</i> Pegasi	W.	71 39 52	3127	73 7 29	3133	74 34 58	3141	76 2 18	3148
	MARS	E.	28 48 42	3188	27 22 19	3198	25 56 8	3209	24 30 9	3218
	Pollux	E.	47 52 55	3031	46 23 21	3043	44 54 2	3056	43 24 59	3069
	SUN	E.	100 30 16	3343	99 6 54	3353	97 43 44	3364	96 20 46	3372
7	Fomalhaut	W.	103 26 15	3480	104 47 1	3493	106 7 33	3505	107 27 52	3517
	<i>α</i> Pegasi	W.	83 17 3	3178	84 43 39	3183	86 10 9	3188	87 36 33	3193
	<i>α</i> Arietis	W.	40 1 32	3073	41 30 15	3076	42 58 54	3080	44 27 28	3082
	Pollux	E.	36 3 41	3135	34 36 14	3149	33 9 4	3164	31 42 12	3179
	SUN	E.	89 28 26	3413	88 6 24	3420	86 44 30	3426	85 22 43	3431
8	<i>α</i> Pegasi	W.	94 47 17	3211	96 13 13	3214	97 39 5	3217	99 4 54	3219
	<i>α</i> Arietis	W.	51 49 33	3093	53 17 51	3094	54 46 8	3095	56 14 24	3095
	Regulus	E.	60 41 26	3078	59 12 50	3081	57 44 17	3083	56 15 47	3085
	SUN	E.	78 35 9	3452	77 13 51	3454	75 52 35	3456	74 31 22	3457
9	<i>α</i> Pegasi	W.	106 13 24	3227	107 39 1	3229	109 4 36	3230	110 30 10	3231
	<i>α</i> Arietis	W.	63 35 50	3091	65 4 11	3088	66 32 35	3086	68 1 2	3083
	Aldebaran	W.	31 41 0	3243	33 6 18	3229	34 31 53	3214	35 57 45	3202
	Regulus	E.	48 53 36	3087	47 25 10	3087	45 56 44	3085	44 28 16	3084
	SUN	E.	67 45 30	3458	66 24 19	3457	65 3 7	3455	63 41 53	3453

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
10	$\alpha$ Arietis W.	69 29 32	3080	70 58 6	3076	72 26 45	3073	73 55 28	3068
	Aldebaran W.	37 23 52	3190	38 50 13	3178	40 16 48	3168	41 43 36	3158
	Regulus E.	42 59 47	3082	41 31 16	3080	40 2 42	3078	38 34 5	3076
	SUN E.	62 20 36	3450	60 59 16	3447	59 37 53	3444	58 16 26	3440
11	$\alpha$ Arietis W.	81 20 35	3041	82 49 57	3034	84 19 27	3028	85 49 5	3021
	Aldebaran W.	49 0 41	3106	50 28 43	3097	51 56 56	3087	53 25 21	3078
	SUN E.	51 28 0	3416	50 6 2	3410	48 43 57	3404	47 21 45	3398
12	$\alpha$ Arietis W.	93 19 32	2982	94 50 7	2974	96 20 52	2965	97 51 48	2957
	Aldebaran W.	60 50 28	3027	62 20 7	3018	63 49 58	3006	65 20 3	2997
	MARS W.	33 35 58	3179	35 2 32	3171	36 29 16	3162	37 56 12	3152
	SUN E.	40 28 56	3365	39 5 59	3358	37 42 54	3351	36 19 41	3343
13	Aldebaran W.	72 53 42	2943	74 25 6	2932	75 56 44	2922	77 28 35	2911
	MARS W.	45 13 50	3101	46 41 59	3090	48 10 21	3079	49 38 56	3068
	Pollux W.	31 7 38	3017	32 37 30	2996	34 7 48	2977	35 38 29	2959
	SUN E.	29 21 39	3313	27 57 43	3308	26 33 41	3305	25 9 35	3301
17	SUN W.	18 50 34	3027	20 20 13	3003	21 50 22	2981	23 20 59	2959
	SATURN E.	54 24 58	2607	52 46 12	2599	51 7 16	2591	49 28 9	2584
	Antares E.	55 21 53	2567	53 42 13	2559	52 2 21	2550	50 22 17	2542
18	SUN W.	31 0 2	2879	32 32 48	2866	34 5 50	2855	35 39 7	2844
	SATURN E.	41 10 12	2553	39 30 12	2547	37 50 4	2543	36 9 50	2538
	Antares E.	41 59 8	2502	40 17 58	2494	38 36 37	2487	36 55 6	2480
	$\alpha$ Aquilæ E.	96 1 7	3038	94 31 41	3028	93 2 3	3018	91 32 13	3010
19	SUN W.	43 28 56	2795	45 3 31	2786	46 38 17	2778	48 13 14	2770
	JUPITER W.	25 5 22	2643	26 43 18	2622	28 21 43	2603	30 0 34	2586
	$\alpha$ Aquilæ E.	84 0 55	2984	82 30 22	2981	80 59 46	2980	79 29 8	2980
	Fomalhaut E.	109 11 25	2914	107 39 24	2898	106 7 3	2884	104 34 24	2870
20	SUN W.	56 10 29	2733	57 46 25	2727	59 22 29	2720	60 58 42	2714
	JUPITER W.	38 19 53	2522	40 0 35	2513	41 41 30	2504	43 22 38	2495
	Spica W.	31 11 50	2413	32 55 6	2405	34 38 33	2398	36 22 10	2392
	$\alpha$ Aquilæ E.	71 56 26	2997	70 26 10	2995	68 56 3	2984	67 26 8	2982
	Fomalhaut E.	96 47 16	2818	95 13 12	2811	93 38 58	2804	92 4 35	2798
21	SUN W.	69 1 47	2685	70 38 47	2680	72 15 54	2675	73 53 8	2669
	JUPITER W.	51 51 10	2458	53 33 23	2450	55 15 46	2445	56 58 17	2438
	Spica W.	45 2 30	2362	46 46 59	2357	48 31 36	2352	50 16 20	2346
	$\alpha$ Aquilæ E.	60 0 39	3110	58 32 41	3133	57 5 12	3161	55 38 16	3191
	Fomalhaut E.	84 10 59	2779	82 36 3	2777	81 1 5	2777	79 26 7	2777
	$\alpha$ Pegasi E.	104 45 33	2505	103 4 27	2498	101 23 11	2492	99 41 46	2486
22	SUN W.	82 0 58	2646	83 38 51	2642	85 16 49	2638	86 54 53	2634
	JUPITER W.	65 32 55	2412	67 16 13	2408	68 59 37	2403	70 43 8	2398
	Spica W.	59 1 48	2324	60 47 13	2319	62 32 45	2315	64 18 22	2311
	VENUS W.	35 33 1	2628	37 11 18	2624	38 49 41	2618	40 28 11	2614
	Fomalhaut E.	71 31 50	2795	69 57 15	2801	68 22 49	2810	66 48 34	2820
	$\alpha$ Pegasi E.	91 12 45	2461	89 30 37	2457	87 48 23	2453	86 6 4	2450



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
10	α Arietis	W.	75 24 17	3063	76 53 12	3058	78 22 13	3053	79 51 20	3047
	Aldebaran	W.	43 10 36	3147	44 37 49	3137	46 5 14	3127	47 32 51	3116
	Regulus	E.	37 5 26	3073	35 36 44	3070	34 7 58	3068	32 39 9	3065
	SUN	E.	56 54 55	3436	55 33 19	3431	54 11 38	3427	52 49 52	3422
11	α Arietis	W.	87 18 52	3014	88 48 48	3006	90 18 53	2998	91 49 8	2991
	Aldebaran	W.	54 53 58	3068	56 22 47	3058	57 51 48	3047	59 21 2	3038
	SUN	E.	45 59 26	3392	44 37 0	3385	43 14 26	3379	41 51 45	3372
12	α Arietis	W.	99 22 55	2948	100 54 13	2939	102 25 43	2929	103 57 25	2920
	Aldebaran	W.	66 50 20	2986	68 20 50	2975	69 51 34	2965	71 22 31	2954
	MARS	W.	39 23 19	3142	40 50 38	3131	42 18 10	3121	43 45 54	3111
	SUN	E.	34 56 19	3337	33 32 50	3330	32 9 13	3324	30 45 29	3319
13	Aldebaran	W.	79 0 40	2901	80 32 58	2889	82 5 31	2878	83 38 18	2867
	MARS	W.	51 7 45	3057	52 36 47	3046	54 6 3	3035	55 35 32	3023
	Pollux	W.	37 9 33	2942	38 40 58	2926	40 12 44	2910	41 44 50	2894
	SUN	E.	23 45 25	3300	22 21 14	3302	20 57 5	3306	19 33 1	3315
17	SUN	W.	24 52 3	2939	26 23 32	2922	27 55 23	2907	29 27 33	2892
	SATURN	E.	47 48 52	2577	46 9 26	2570	44 29 50	2564	42 50 5	2558
	Antares	E.	48 42 2	2533	47 1 35	2525	45 20 57	2517	43 40 8	2510
18	SUN	W.	37 12 38	2833	38 46 23	2822	40 20 22	2813	41 54 33	2804
	SATURN	E.	34 29 30	2535	32 49 6	2533	31 8 38	2531	29 28 8	2530
	Antares	E.	35 13 25	2474	33 31 35	2467	31 49 35	2460	30 7 26	2455
	α Aquilæ	E.	90 2 13	3003	88 32 4	2997	87 1 47	2992	85 31 24	2987
19	SUN	W.	49 48 21	2762	51 23 39	2755	52 59 6	2747	54 34 43	2741
	JUPITER	W.	31 39 48	2571	33 19 23	2558	34 59 16	2545	36 39 26	2533
	α Aquilæ	E.	77 58 30	2981	76 27 53	2983	74 57 19	2987	73 26 50	2991
	Fomalhaut	E.	103 1 27	2859	101 28 15	2847	99 54 48	2837	98 21 8	2828
20	SUN	W.	62 35 3	2707	64 11 33	2702	65 48 10	2696	67 24 55	2691
	JUPITER	W.	45 3 58	2487	46 45 30	2479	48 27 13	2472	50 9 6	2464
	Spica	W.	38 5 56	2385	39 49 52	2380	41 33 56	2373	43 18 9	2368
	α Aquilæ	E.	65 56 26	3057	64 26 59	3052	62 57 51	3046	61 29 3	3038
	Fomalhaut	E.	90 30 4	2792	88 55 25	2788	87 20 41	2784	85 45 52	2781
21	SUN	W.	75 30 29	2664	77 7 57	2660	78 45 31	2655	80 23 11	2650
	JUPITER	W.	58 40 57	2433	60 23 45	2427	62 6 41	2422	63 49 44	2417
	Spica	W.	52 1 12	2342	53 46 11	2337	55 31 17	2333	57 16 29	2328
	α Aquilæ	E.	54 11 56	3225	52 46 17	3265	51 21 24	3307	49 57 21	3356
	Fomalhaut	E.	77 51 9	2779	76 16 13	2782	74 41 21	2785	73 6 33	2788
	α Pegasi	E.	98 0 13	2480	96 18 32	2475	94 36 43	2470	92 54 47	2465
22	SUN	W.	88 33 2	2630	90 11 16	2626	91 49 36	2622	93 28 1	2619
	JUPITER	W.	72 26 45	2394	74 10 28	2390	75 54 17	2386	77 38 12	2382
	Spica	W.	66 4 5	2308	67 49 53	2304	69 35 47	2300	71 21 46	2297
	VENUS	W.	42 6 47	2610	43 45 29	2605	45 24 17	2601	47 3 10	2597
	Fomalhaut	E.	65 14 32	2831	63 40 44	2844	62 7 13	2859	60 34 1	2876
	α Pegasi	E.	84 23 41	2448	82 41 14	2445	80 58 44	2443	79 16 11	2441

GREENWICH MEAN TIME.										
LUNAR DISTANCES.										
Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.	
23	SUN W.	95 6 30	2616	96 45 3	2612	98 23 41	2610	100 2 23	2607	
	JUPITER W.	79 22 12	2379	81 6 17	2375	82 50 27	2373	84 34 41	2370	
	Spica W.	73 7 50	2294	74 53 59	2290	76 40 13	2287	78 26 31	2285	
	VENUS W.	48 42 9	2593	50 21 13	2590	52 0 22	2586	53 39 36	2583	
	SATURN W.	28 26 18	2368	30 10 38	2359	31 55 12	2351	33 39 57	2344	
	Antares W.	27 26 56	2294	29 13 4	2291	30 59 17	2287	32 45 36	2284	
	Fomalhaut E.	59 1 11	2694	57 28 45	2696	55 56 47	2690	54 25 19	2688	
	α Pegasi E.	77 33 35	2441	75 50 58	2440	74 8 20	2440	72 25 42	2441	
24	SUN W.	108 16 44	2596	109 55 44	2595	111 34 46	2593	113 13 50	2593	
	JUPITER W.	93 16 49	2358	95 1 24	2357	96 46 1	2355	98 30 41	2354	
	Spica W.	87 18 59	2273	89 5 38	2271	90 52 20	2270	92 39 4	2268	
	VENUS W.	61 56 49	2569	63 36 27	2566	65 16 8	2564	66 55 52	2563	
	SATURN W.	42 25 58	2318	44 11 31	2315	45 57 9	2311	47 42 52	2309	
	Antares W.	41 38 15	2270	43 24 58	2269	45 11 43	2267	46 58 31	2265	
	α Pegasi E.	63 52 57	2451	62 10 35	2456	60 28 20	2461	58 46 12	2467	
	α Arietis E.	106 11 25	2287	104 25 7	2285	102 38 45	2283	100 52 20	2281	
25	VENUS W.	75 15 3	2557	76 54 57	2556	78 34 52	2556	80 14 47	2557	
	SATURN W.	56 32 16	2300	58 18 15	2299	60 4 16	2299	61 50 17	2299	
	Antares W.	55 53 0	2262	57 39 56	2261	59 26 53	2261	61 13 50	2262	
	α Pegasi E.	50 18 16	2517	48 37 26	2531	46 56 56	2548	45 16 49	2567	
	α Arietis E.	91 59 49	2277	90 13 16	2277	88 26 43	2276	86 40 11	2276	
26	VENUS W.	88 34 8	2562	90 13 55	2564	91 53 39	2567	93 33 19	2569	
	SATURN W.	70 40 14	2304	72 26 9	2307	74 11 59	2308	75 57 47	2311	
	Antares W.	70 8 15	2268	71 55 2	2270	73 41 45	2275	75 28 24	2276	
	α Arietis E.	77 47 50	2286	76 1 30	2288	74 15 13	2291	72 29 1	2295	
	Aldebaran E.	110 23 3	2320	108 37 32	2321	106 52 3	2322	105 6 36	2324	
27	VENUS W.	101 50 35	2589	103 29 45	2593	105 8 49	2599	106 47 45	2605	
	SATURN W.	84 45 36	2330	86 30 52	2335	88 16 0	2340	90 1 1	2346	
	Antares W.	84 20 26	2296	86 6 32	2301	87 52 30	2306	89 38 21	2311	
	α Aquilæ W.	39 39 51	2693	40 53 18	2785	42 8 36	2691	43 25 33	2697	
	α Arietis E.	63 39 25	2317	61 53 51	2323	60 8 25	2330	58 23 9	2336	
	Aldebaran E.	96 20 18	2342	94 35 19	2346	92 50 26	2351	91 5 41	2357	
28	SATURN W.	98 43 48	2380	100 27 51	2389	102 11 42	2397	103 55 21	2405	
	α Aquilæ W.	50 9 47	2319	51 33 37	2379	52 58 13	2346	54 23 28	2316	
	α Arietis E.	49 39 25	2377	47 55 17	2386	46 11 22	2396	44 27 42	2408	
	Aldebaran E.	82 24 10	2391	80 40 23	2400	78 56 48	2408	77 13 25	2417	
29	α Aquilæ W.	61 37 6	2319	63 4 52	2310	64 32 50	2301	66 0 59	2303	
	α Arietis E.	35 53 36	2473	34 11 45	2489	32 30 16	2505	30 49 10	2524	
	Aldebaran E.	68 39 57	2470	66 58 2	2482	65 16 23	2494	63 35 1	2507	
	MARS E.	104 46 47	2586	103 7 33	2597	101 28 34	2608	99 49 50	2619	
30	α Aquilæ W.	73 23 2	2087	74 51 27	2091	76 19 48	2095	77 48 4	2101	
	Fomalhaut W.	48 28 49	2306	49 52 53	2381	51 17 27	2359	52 42 27	2340	
	Aldebaran E.	55 12 50	2577	53 33 23	2593	51 54 18	2609	50 15 35	2606	
	MARS E.	91 40 8	2680	90 3 1	2693	88 26 12	2706	86 49 40	2719	
	Pollux E.	97 3 32	2543	95 23 18	2555	93 43 21	2568	92 3 42	2580	

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
23	SUN W.	101 41 9	2604	103 19 58	2601	104 58 51	2600	106 37 46	2598
	JUPITER W.	86 18 59	2367	88 3 21	2364	89 47 47	2362	91 32 17	2360
	Spica W.	80 12 53	2282	81 59 19	2279	83 45 49	2277	85 32 22	2274
	VENUS W.	55 18 54	2580	56 58 17	2577	58 37 44	2574	60 17 15	2572
	SATURN W.	35 24 53	2337	37 9 58	2332	38 55 11	2327	40 40 31	2322
	Antares W.	34 31 59	2281	36 18 27	2278	38 4 59	2275	39 51 35	2272
	Fomalhaut E.	52 54 26	2997	51 24 11	3033	49 54 39	3071	48 25 54	3114
	α Pegasi E.	70 43 5	2441	69 0 29	2443	67 17 55	2445	65 35 24	2448
24	SUN W.	114 52 55	2592	116 32 1	2591	118 11 8	2591	119 50 15	2592
	JUPITER W.	100 15 22	2353	102 0 5	2353	103 44 48	2352	105 29 32	2352
	Spica W.	94 25 51	2267	96 12 39	2266	97 59 28	2265	99 46 19	2265
	VENUS W.	68 35 38	2561	70 15 27	2560	71 55 17	2559	73 35 9	2557
	SATURN W.	49 28 39	2306	51 14 30	2304	53 0 23	2303	54 46 18	2301
	Antares W.	48 45 22	2264	50 32 15	2263	52 19 9	2262	54 6 4	2262
	α Pegasi E.	57 4 13	2475	55 22 24	2483	53 40 47	2493	51 59 24	2504
	α Arietis E.	99 5 53	2280	97 19 24	2279	95 32 53	2278	93 46 21	2278
25	VENUS W.	81 54 41	2557	83 34 35	2558	85 14 28	2559	86 54 19	2561
	SATURN W.	63 36 18	2299	65 22 19	2300	67 8 19	2301	68 54 17	2302
	Antares W.	63 0 46	2262	64 47 41	2264	66 34 34	2264	68 21 26	2266
	α Pegasi E.	43 37 9	2588	41 57 58	2613	40 19 21	2642	38 41 22	2675
	α Arietis E.	84 53 39	2279	83 7 9	2280	81 20 40	2282	79 34 14	2283
26	VENUS W.	95 12 56	2573	96 52 28	2576	98 31 56	2580	100 11 18	2584
	SATURN W.	77 43 31	2313	79 29 11	2317	81 14 45	2321	83 0 14	2326
	Antares W.	77 14 59	2279	79 1 29	2283	80 47 54	2287	82 34 13	2291
	α Arietis E.	70 42 54	2298	68 56 52	2302	67 10 56	2307	65 25 7	2312
	Aldebaran E.	103 21 12	2326	101 35 51	2330	99 50 35	2333	98 5 24	2337
27	VENUS W.	108 26 33	2611	110 5 13	2618	111 43 44	2624	113 22 6	2632
	SATURN W.	91 45 53	2353	93 30 36	2359	95 15 10	2366	96 59 34	2373
	Antares W.	91 24 4	2317	93 9 38	2324	94 55 3	2331	96 40 18	2338
	α Aquilæ W.	44 44 0	3534	46 3 47	3470	47 24 45	3413	48 46 47	3362
	α Arietis E.	56 38 2	2344	54 53 6	2350	53 8 20	2359	51 23 46	2368
	Aldebaran E.	89 21 4	2363	87 36 36	2369	85 52 17	2376	84 8 8	2384
28	SATURN W.	105 38 48	2415	107 22 2	2424	109 5 2	2434	110 47 48	2444
	α Aquilæ W.	55 49 18	3190	57 15 39	3168	58 42 26	3149	60 9 36	3133
	α Arietis E.	42 44 18	2419	41 1 10	2431	39 18 20	2444	37 35 48	2458
	Aldebaran E.	75 30 15	2426	73 47 18	2437	72 4 36	2448	70 22 9	2458
29	α Aquilæ W.	67 29 17	3089	68 57 40	3086	70 26 7	3085	71 54 35	3086
	α Arietis E.	29 8 30	2543	27 28 17	2565	25 48 34	2590	24 9 25	2618
	Aldebaran E.	61 53 57	2580	60 13 12	2533	58 32 45	2548	56 52 38	2561
	MARS E.	98 11 21	2631	96 33 8	2643	94 55 12	2655	93 17 32	2667
30	α Aquilæ W.	79 16 13	3107	80 44 14	3115	82 12 5	3124	83 39 45	3134
	Fomalhaut W.	54 7 49	3244	55 33 30	3211	56 59 26	3200	58 25 35	3193
	Aldebaran E.	48 37 15	2643	46 59 18	2660	45 21 45	2679	43 44 37	2693
	MARS E.	85 13 25	2732	83 37 28	2747	82 1 50	2760	80 26 29	2774
	Pollux E.	90 24 20	2593	88 45 16	2607	87 6 30	2620	85 28 2	2634

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		h m s	°	° ' "	"	' "	°	m s	"
Sat.	1	12 30 32.73	9.056	S. 3 17 57.6	-58.21	16 1.52	64.38	10 23.14	0.708
SUN.	2	12 34 10.22	9.069	3 41 13.7	58.11	16 1.80	64.43	10 42.15	0.786
Mon.	3	12 37 48.04	9.083	4 4 27.3	58.01	16 2.07	64.48	11 0.85	0.772
Tues.	4	12 41 26.20	9.098	4 27 38.2	-57.89	16 2.34	64.53	11 19.18	0.756
Wed.	5	12 45 4.73	9.114	4 50 46.0	57.75	16 2.61	64.58	11 37.16	0.740
Thur.	6	12 48 43.65	9.130	5 13 50.3	57.60	16 2.89	64.64	11 54.74	0.724
Frid.	7	12 52 22.98	9.148	5 36 50.7	-57.43	16 3.16	64.70	12 11.92	0.706
Sat.	8	12 56 2.75	9.166	5 59 46.9	57.25	16 3.43	64.76	12 28.65	0.688
SUN.	9	12 59 42.97	9.186	6 22 38.6	57.05	16 3.70	64.82	12 44.94	0.669
Mon.	10	13 3 23.66	9.206	6 45 25.3	-56.83	16 3.97	64.89	13 0.76	0.649
Tues.	11	13 7 4.84	9.227	7 8 6.6	56.60	16 4.24	64.96	13 16.08	0.628
Wed.	12	13 10 46.54	9.248	7 30 42.2	56.35	16 4.51	65.03	13 30.90	0.607
Thur.	13	13 14 28.75	9.270	7 53 11.6	-56.09	16 4.78	65.11	13 45.21	0.585
Frid.	14	13 18 11.50	9.292	8 15 34.5	55.81	16 5.05	65.19	13 58.97	0.562
Sat.	15	13 21 54.81	9.315	8 37 50.4	55.51	16 5.33	65.27	14 12.18	0.539
SUN.	16	13 25 38.68	9.340	8 59 59.0	-55.19	16 5.60	65.35	14 24.83	0.515
Mon.	17	13 29 23.13	9.365	9 21 59.8	54.86	16 5.88	65.44	14 36.89	0.491
Tues.	18	13 33 8.18	9.390	9 43 52.4	54.51	16 6.16	65.53	14 48.38	0.466
Wed.	19	13 36 53.83	9.415	10 5 36.4	-54.15	16 6.43	65.62	14 59.24	0.440
Thur.	20	13 40 40.11	9.441	10 27 11.5	53.77	16 6.71	65.71	15 9.51	0.414
Frid.	21	13 44 27.02	9.468	10 48 37.2	53.37	16 6.98	65.81	15 19.11	0.387
Sat.	22	13 48 14.57	9.495	11 9 53.2	-52.95	16 7.25	65.91	15 28.09	0.360
SUN.	23	13 52 2.79	9.523	11 30 59.0	52.52	16 7.52	66.01	15 36.41	0.331
Mon.	24	13 55 51.69	9.552	11 51 54.3	52.07	16 7.79	66.11	15 44.03	0.302
Tues.	25	13 59 41.28	9.581	12 12 38.7	-51.61	16 8.06	66.21	15 50.98	0.273
Wed.	26	14 3 31.58	9.611	12 33 11.8	51.13	16 8.33	66.31	15 57.22	0.244
Thur.	27	14 7 22.60	9.641	12 53 33.2	50.64	16 8.59	66.42	16 2.74	0.214
Frid.	28	14 11 14.36	9.672	13 13 42.5	-50.13	16 8.85	66.53	16 7.52	0.184
Sat.	29	14 15 6.87	9.704	13 33 39.3	49.60	16 9.11	66.64	16 11.55	0.152
SUN.	30	14 19 0.16	9.736	13 53 23.4	49.06	16 9.36	66.75	16 14.81	0.120
Mon.	31	14 22 54.22	9.769	14 12 54.2	48.50	16 9.61	66.87	16 17.29	0.087
Tues.	32	14 26 49.09	9.803	S. 14 32 11.4	-47.92	16 9.86	66.98	16 18.98	0.053

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.18 from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing

AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		h m s	s	° ' "	"	m s	s	h m s
Sat.	1	12 30 34.30	9.058	S. 3 18 7.7	-58.23	10 23.28	0.798	12 40 57.58
SUN.	2	12 34 11.84	9.071	3 41 24.0	58.13	10 42.29	0.786	12 44 54.13
Mon.	3	12 37 49.70	9.085	4 4 38.0	58.02	11 0.99	0.772	12 48 50.69
Tues.	4	12 41 27.92	9.100	4 27 49.1	-57.90	11 19.32	0.756	12 52 47.24
Wed.	5	12 45 6.49	9.116	4 50 57.2	57.76	11 37.30	0.740	12 56 43.79
Thur.	6	12 48 45.46	9.132	5 14 1.7	57.61	11 54.88	0.724	13 0 40.34
Frid.	7	12 52 24.84	9.150	5 37 2.4	-57.44	12 12.06	0.706	13 4 36.90
Sat.	8	12 56 4.66	9.168	5 59 58.8	57.26	12 28.79	0.688	13 8 33.45
SUN.	9	12 59 44.92	9.188	6 22 50.7	57.06	12 45.08	0.669	13 12 30.00
Mon.	10	13 3 25.66	9.208	6 45 37.6	-56.84	13 0.90	0.649	13 16 26.56
Tues.	11	13 7 6.89	9.229	7 8 19.1	56.61	13 16.22	0.628	13 20 23.11
Wed.	12	13 10 48.62	9.250	7 30 54.9	56.36	13 31.04	0.607	13 24 19.66
Thur.	13	13 14 30.88	9.272	7 53 24.5	-56.10	13 45.34	0.585	13 28 16.22
Frid.	14	13 18 13.67	9.295	8 15 47.5	55.82	13 59.10	0.562	13 32 12.77
Sat.	15	13 21 57.02	9.318	8 38 3.5	55.52	14 12.31	0.539	13 36 9.33
SUN.	16	13 25 40.93	9.342	9 0 12.2	-55.20	14 24.95	0.515	13 40 5.88
Mon.	17	13 29 25.42	9.366	9 22 13.1	54.87	14 37.01	0.491	13 44 2.43
Tues.	18	13 33 10.50	9.391	9 44 5.8	54.52	14 48.49	0.466	13 47 58.99
Wed.	19	13 36 56.19	9.417	10 5 50.0	-54.15	14 59.35	0.440	13 51 55.54
Thur.	20	13 40 42.49	9.443	10 27 25.1	53.77	15 9.61	0.414	13 55 52.10
Frid.	21	13 44 29.44	9.470	10 48 50.9	53.37	15 19.21	0.387	13 59 48.65
Sat.	22	13 48 17.02	9.497	11 10 6.9	-52.95	15 28.18	0.360	14 3 45.20
SUN.	23	13 52 5.27	9.525	11 31 12.7	52.52	15 36.49	0.331	14 7 41.76
Mon.	24	13 55 54.20	9.553	11 52 8.0	52.07	15 44.11	0.302	14 11 38.31
Tues.	25	13 59 43.81	9.582	12 12 52.3	-51.61	15 51.05	0.273	14 15 34.86
Wed.	26	14 3 34.14	9.612	12 33 25.4	51.13	15 57.28	0.244	14 19 31.42
Thur.	27	14 7 25.18	9.642	12 53 46.7	50.64	16 2.80	0.214	14 23 27.98
Frid.	28	14 11 16.96	9.673	13 13 55.9	-50.13	16 7.57	0.184	14 27 24.53
Sat.	29	14 15 9.49	9.705	13 33 52.7	49.60	16 11.59	0.152	14 31 21.08
SUN.	30	14 19 2.80	9.737	13 53 36.6	49.05	16 14.84	0.120	14 35 17.64
Mon.	31	14 22 56.88	9.770	14 13 7.3	48.49	16 17.31	0.087	14 39 14.19
Tues.	32	14 26 51.76	9.804	S. 14 32 24.4	-47.92	16 18.99	0.053	14 43 10.75

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
 The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour,  
 + 9°.8565.  
 (Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		λ	λ'					
1	274	188 19 39.2	18 45.1	147.61	+ 0.56	0.0002161	-51.7	h m s 11 17 11.18
2	275	189 18 42.9	17 48.7	147.70	0.52	0.0000921	51.5	11 13 15.27
3	276	190 17 48.8	16 54.5	147.79	0.45	9.9999686	51.3	11 9 19.36
4	277	191 16 57.0	16 2.6	147.88	+ 0.37	9.9998456	-51.2	11 5 23.45
5	278	192 16 7.4	15 12.9	147.97	0.26	9.9997229	51.1	11 1 27.55
6	279	193 15 20.2	14 25.6	148.07	+ 0.13	9.9996004	51.0	10 57 31.64
7	280	194 14 35.2	13 40.5	148.17	0.00	9.9994782	-50.9	10 53 35.73
8	281	195 13 52.5	12 57.7	148.27	- 0.13	9.9993562	50.8	10 49 39.82
9	282	196 13 12.2	12 17.3	148.37	0.25	9.9992342	50.9	10 45 43.92
10	283	197 12 34.2	11 39.2	148.47	- 0.37	9.9991121	-50.9	10 41 48.01
11	284	198 11 58.6	11 3.5	148.56	0.46	9.9989899	51.0	10 37 52.10
12	285	199 11 25.2	10 30.0	148.65	0.53	9.9988674	51.0	10 33 56.20
13	286	200 10 54.0	9 58.7	148.74	- 0.57	9.9987448	-51.1	10 30 0.29
14	287	201 10 24.9	9 29.5	148.83	0.57	9.9986219	51.2	10 26 4.38
15	288	202 9 57.9	9 2.3	148.92	0.55	9.9984988	51.3	10 22 8.47
16	289	203 9 32.9	8 37.2	149.00	- 0.50	9.9983754	-51.4	10 18 12.57
17	290	204 9 9.8	8 14.0	149.08	0.43	9.9982519	51.5	10 14 16.66
18	291	205 8 48.8	7 52.9	149.16	0.31	9.9981283	51.5	10 10 20.75
19	292	206 8 29.4	7 33.4	149.24	- 0.20	9.9980047	-51.5	10 6 24.84
20	293	207 8 11.9	7 15.7	149.31	- 0.07	9.9978812	51.4	10 2 28.93
21	294	208 7 56.2	6 59.9	149.38	+ 0.06	9.9977582	51.2	9 58 33.02
22	295	209 7 42.0	6 45.6	149.45	+ 0.20	9.9976354	-51.0	9 54 37.12
23	296	210 7 29.6	6 33.1	149.52	0.32	9.9975135	50.7	9 50 41.21
24	297	211 7 18.9	6 22.3	149.59	0.42	9.9973921	50.3	9 46 45.30
25	298	212 7 9.8	6 13.0	149.66	+ 0.51	9.9972719	-49.9	9 42 49.39
26	299	213 7 2.5	6 5.6	149.73	0.57	9.9971527	49.4	9 38 53.48
27	300	214 6 56.8	5 59.8	149.80	0.60	9.9970348	48.9	9 34 57.57
28	301	215 6 52.9	5 55.8	149.87	+ 0.60	9.9969182	-48.3	9 31 1.67
29	302	216 6 50.8	5 53.6	149.95	0.58	9.9968030	47.7	9 27 5.76
30	303	217 6 50.7	5 53.3	150.03	0.52	9.9966892	47.1	9 23 9.85
31	304	218 6 52.3	5 54.8	150.11	0.44	9.9965772	46.4	9 19 13.94
32	305	219 6 56.0	5 58.4	150.19	+ 0.33	9.9964666	-45.7	9 15 18.03
NOTE.—The numbers in column λ correspond to the true equinox of the date; in column λ' to the mean equinox of January 0 <sup>h</sup> .0								Diff. for 1 Hour, —9 <sup>s</sup> .8296, (Table II.)

## GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	' "	' "	' "	"	' "	"	h m	m	d
1	15 33.2	15 27.7	56 58.3	-1.69	56 38.0	-1.69	13 20.3	2.06	15.5
2	15 22.2	15 16.9	56 17.8	1.66	55 58.2	1.60	14 10.3	2.11	16.5
3	15 11.8	15 7.0	55 39.5	1.51	55 22.0	1.40	15 1.2	2.13	17.5
4	15 2.6	14 58.8	55 6.0	-1.25	54 51.9	-1.10	15 52.4	2.13	18.5
5	14 55.5	14 52.8	54 39.8	0.92	54 29.9	0.72	16 43.2	2.10	19.5
6	14 50.8	14 49.4	54 22.5	0.52	54 17.5	-0.31	17 32.8	2.03	20.5
7	14 48.8	14 48.8	54 15.1	-0.09	54 15.3	+0.13	18 20.7	1.96	21.5
8	14 49.6	14 51.1	54 18.2	+0.35	54 23.6	0.56	19 6.8	1.88	22.5
9	14 53.3	14 56.1	54 31.6	0.76	54 41.9	0.95	19 51.3	1.83	23.5
10	14 59.5	15 3.5	54 54.5	+1.13	55 9.1	+1.29	20 34.9	1.80	24.5
11	15 7.9	15 12.8	55 25.5	1.43	55 43.3	1.54	21 18.2	1.81	25.5
12	15 18.0	15 23.4	56 2.4	1.63	56 22.4	1.68	22 2.2	1.86	26.5
13	15 29.0	15 34.6	56 42.8	+1.71	57 3.4	+1.70	22 47.8	1.95	27.5
14	15 40.1	15 45.5	57 23.7	1.66	57 43.3	1.59	23 36.2	2.08	28.5
15	15 50.5	15 55.2	58 1.8	1.49	58 19.0	1.36	6		29.5
16	15 59.4	16 3.2	58 34.6	+1.22	58 48.3	+1.05	0 28.0	2.24	1.0
17	16 6.3	16 8.9	58 59.9	0.88	59 9.3	0.70	1 23.8	2.40	2.0
18	16 10.9	16 12.3	59 16.7	0.52	59 21.8	0.34	2 23.0	2.52	3.0
19	16 13.1	16 13.5	59 24.9	+0.18	59 26.1	+0.02	3 24.2	2.56	4.0
20	16 13.3	16 12.7	59 25.5	-0.11	59 23.3	-0.24	4 25.3	2.51	5.0
21	16 11.7	16 10.4	59 19.7	0.35	59 14.8	0.45	5 24.4	2.40	6.0
22	16 8.7	16 6.8	59 8.8	-0.54	59 1.7	-0.63	6 20.1	2.25	7.0
23	16 4.7	16 2.2	58 53.8	0.70	58 44.9	0.77	7 12.5	2.12	8.0
24	15 59.6	15 56.8	58 35.3	0.84	58 24.9	0.90	8 2.0	2.02	9.0
25	15 53.7	15 50.5	58 13.7	-0.96	58 1.7	-1.03	8 49.7	1.96	10.0
26	15 47.0	15 43.3	57 49.0	1.09	57 35.5	1.15	9 36.5	1.95	11.0
27	15 39.5	15 35.5	57 21.4	1.20	57 6.6	1.25	10 23.6	1.98	12.0
28	15 31.3	15 27.0	56 51.3	-1.29	56 35.6	-1.31	11 11.6	2.03	13.0
29	15 22.7	15 18.4	56 19.7	1.33	56 3.8	1.32	12 0.9	2.09	14.0
30	15 14.1	15 9.9	55 48.0	1.30	55 32.6	1.25	12 51.6	2.13	15.0
31	15 5.9	15 2.1	55 17.9	1.19	55 4.0	1.11	13 43.0	2.15	16.0
32	14 58.6	14 55.5	54 51.3	-1.00	54 39.9	-0.88	14 34.4	2.13	17.0

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 1.					MONDAY 3.				
0	1 34 48.28	2.1343	N.15 7 2.5	11.402	0	3 19 10.87	2.2112	N.22 19 15.0	6.351
1	1 36 56.38	2.1358	15 18 24.0	11.315	1	3 21 23.58	2.2123	22 25 32.5	6.222
2	1 39 4.58	2.1375	15 29 40.3	11.227	2	3 23 36.35	2.2134	22 31 42.8	6.112
3	1 41 12.88	2.1391	15 40 51.2	11.137	3	3 25 49.19	2.2146	22 37 46.0	5.992
4	1 43 21.27	2.1408	15 51 56.7	11.046	4	3 28 2.10	2.2157	22 43 41.9	5.872
5	1 45 29.77	2.1425	16 2 56.7	10.954	5	3 30 15.07	2.2167	22 49 30.6	5.751
6	1 47 38.37	2.1442	16 13 51.2	10.862	6	3 32 28.10	2.2176	22 55 12.0	5.630
7	1 49 47.07	2.1459	16 24 40.2	10.770	7	3 34 41.18	2.2185	23 0 46.2	5.509
8	1 51 55.88	2.1477	16 35 23.6	10.676	8	3 36 54.32	2.2194	23 6 13.1	5.388
9	1 54 4.79	2.1493	16 46 1.3	10.581	9	3 39 7.51	2.2203	23 11 32.7	5.266
10	1 56 13.80	2.1511	16 56 33.3	10.486	10	3 41 20.75	2.2211	23 16 45.0	5.143
11	1 58 22.92	2.1528	17 6 59.6	10.389	11	3 43 34.04	2.2218	23 21 49.9	5.020
12	2 0 32.14	2.1545	17 17 20.0	10.292	12	3 45 47.37	2.2225	23 26 47.4	4.897
13	2 2 41.46	2.1562	17 27 34.6	10.194	13	3 48 0.74	2.2232	23 31 37.6	4.773
14	2 4 50.89	2.1580	17 37 43.3	10.096	14	3 50 14.15	2.2238	23 36 20.4	4.648
15	2 7 0.42	2.1598	17 47 46.1	9.997	15	3 52 27.60	2.2244	23 40 55.8	4.523
16	2 9 10.06	2.1616	17 57 42.9	9.897	16	3 54 41.08	2.2250	23 45 23.8	4.400
17	2 11 19.81	2.1633	18 7 33.7	9.796	17	3 56 54.60	2.2255	23 49 44.4	4.281
18	2 13 29.66	2.1650	18 17 18.4	9.693	18	3 59 8.14	2.2258	23 53 57.5	4.157
19	2 15 39.61	2.1667	18 26 56.9	9.591	19	4 1 21.70	2.2262	23 58 3.2	4.033
20	2 17 49.66	2.1684	18 36 29.3	9.487	20	4 3 35.29	2.2266	24 2 1.4	3.908
21	2 19 59.82	2.1702	18 45 55.4	9.383	21	4 5 48.89	2.2268	24 5 52.2	3.784
22	2 22 10.09	2.1720	18 55 15.3	9.279	22	4 8 2.51	2.2272	24 9 35.5	3.659
23	2 24 20.46	2.1737	N.19 4 28.9	9.174	23	4 10 16.15	2.2273	N.24 13 11.3	3.534
SUNDAY 2.					TUESDAY 4.				
0	2 26 30.93	2.1754	N.19 13 36.2	9.068	0	4 12 29.79	2.2274	N.24 16 39.6	3.409
1	2 28 41.51	2.1772	19 22 37.1	8.962	1	4 14 43.44	2.2276	24 20 0.4	3.285
2	2 30 52.19	2.1788	19 31 31.6	8.854	2	4 16 57.10	2.2277	24 23 13.8	3.161
3	2 33 2.97	2.1805	19 40 19.6	8.746	3	4 19 10.76	2.2276	24 26 19.7	3.035
4	2 35 13.85	2.1822	19 49 1.1	8.637	4	4 21 24.41	2.2275	24 29 18.0	2.909
5	2 37 24.83	2.1838	19 57 36.1	8.529	5	4 23 38.06	2.2274	24 32 8.8	2.784
6	2 39 35.91	2.1854	20 6 4.6	8.419	6	4 25 51.70	2.2273	24 34 52.1	2.659
7	2 41 47.08	2.1871	20 14 26.4	8.308	7	4 28 5.33	2.2271	24 37 27.9	2.534
8	2 43 58.36	2.1887	20 22 41.6	8.197	8	4 30 18.95	2.2268	24 39 56.2	2.409
9	2 46 9.73	2.1902	20 30 50.1	8.086	9	4 32 32.55	2.2265	24 42 17.0	2.284
10	2 48 21.19	2.1918	20 38 51.9	7.974	10	4 34 46.13	2.2261	24 44 30.3	2.159
11	2 50 32.75	2.1934	20 46 47.0	7.862	11	4 36 59.68	2.2257	24 46 36.1	2.033
12	2 52 44.40	2.1950	20 54 35.3	7.748	12	4 39 13.21	2.2252	24 48 34.3	1.908
13	2 54 56.15	2.1965	21 2 16.8	7.634	13	4 41 26.71	2.2247	24 50 25.1	1.783
14	2 57 7.98	2.1979	21 9 51.4	7.520	14	4 43 40.17	2.2240	24 52 8.3	1.658
15	2 59 19.90	2.1994	21 17 19.2	7.406	15	4 45 53.59	2.2234	24 53 44.1	1.534
16	3 1 31.91	2.2008	21 24 40.1	7.290	16	4 48 6.98	2.2227	24 55 12.4	1.409
17	3 3 44.00	2.2022	21 31 54.0	7.173	17	4 50 20.32	2.2219	24 56 33.2	1.284
18	3 5 56.17	2.2036	21 39 0.9	7.057	18	4 52 33.61	2.2212	24 57 46.5	1.159
19	3 8 8.43	2.2050	21 46 0.9	6.942	19	4 54 46.86	2.2204	24 58 52.3	1.035
20	3 10 20.77	2.2062	21 52 53.9	6.824	20	4 57 0.06	2.2195	24 59 50.7	0.911
21	3 12 33.18	2.2075	21 59 39.8	6.707	21	4 59 13.20	2.2185	25 0 41.6	0.786
22	3 14 45.67	2.2088	22 6 18.7	6.588	22	5 1 26.28	2.2174	25 1 25.0	0.662
23	3 16 58.24	2.2100	22 12 50.4	6.469	23	5 3 39.29	2.2164	25 2 1.0	0.538
24	3 19 10.87	2.2112	N.22 19 15.0	6.351	24	5 5 52.25	2.2154	N.25 2 29.6	0.413



GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 5.					FRIDAY 7.				
0	5 5 52.25	2.2154	N.25 2 29.6	0.475	0	6 50 4.43	2.1187	N.23 5 26.8	5.141
1	5 8 5.14	2.2142	25 2 50.8	0.291	1	6 52 11.11	2.1099	23 0 15.2	5.246
2	5 10 17.05	2.2129	25 3 4.5	0.168	2	6 54 17.62	2.1071	22 54 57.3	5.350
3	5 12 30.09	2.2117	25 3 10.9	+ 0.045	3	6 56 23.96	2.1042	22 49 33.2	5.453
4	5 14 43.35	2.2104	25 3 9.9	- 0.076	4	6 58 30.12	2.1013	22 44 2.9	5.557
5	5 16 55.94	2.2091	25 3 1.5	0.202	5	7 0 36.11	2.0984	22 38 26.4	5.659
6	5 19 8.44	2.2076	25 2 45.7	0.324	6	7 2 41.93	2.0955	22 32 43.8	5.762
7	5 21 20.85	2.2061	25 2 22.6	0.446	7	7 4 47.57	2.0926	22 26 55.0	5.865
8	5 23 33.17	2.2046	25 1 52.2	0.567	8	7 6 53.04	2.0897	22 21 0.2	5.964
9	5 25 45.40	2.2031	25 1 14.5	0.689	9	7 8 58.34	2.0868	22 14 59.3	6.065
10	5 27 57.54	2.2015	25 0 29.5	0.811	10	7 11 3.46	2.0838	22 8 52.4	6.164
11	5 30 9.58	2.1998	24 59 37.2	0.932	11	7 13 8.40	2.0809	22 2 39.6	6.265
12	5 32 21.52	2.1982	24 58 37.7	1.052	12	7 15 13.17	2.0781	21 56 20.8	6.362
13	5 34 33.36	2.1964	24 57 30.9	1.173	13	7 17 17.77	2.0752	21 49 56.1	6.461
14	5 36 45.09	2.1946	24 56 16.9	1.293	14	7 19 22.19	2.0722	21 43 25.5	6.558
15	5 38 56.71	2.1927	24 54 55.7	1.413	15	7 21 26.44	2.0693	21 36 49.1	6.655
16	5 41 8.22	2.1908	24 53 27.3	1.533	16	7 23 30.51	2.0664	21 30 6.9	6.752
17	5 43 19.61	2.1889	24 51 51.8	1.652	17	7 25 34.41	2.0635	21 23 18.9	6.848
18	5 45 30.89	2.1870	24 50 9.1	1.771	18	7 27 38.13	2.0606	21 16 25.2	6.943
19	5 47 42.05	2.1849	24 48 19.3	1.889	19	7 29 41.68	2.0577	21 9 25.7	7.038
20	5 49 53.08	2.1828	24 46 22.4	2.008	20	7 31 45.05	2.0547	21 2 20.6	7.132
21	5 52 3.99	2.1808	24 44 18.4	2.126	21	7 33 48.25	2.0518	20 55 9.8	7.226
22	5 54 14.78	2.1787	24 42 7.3	2.245	22	7 35 51.27	2.0490	20 47 53.5	7.318
23	5 56 25.44	2.1766	N.24 39 49.2	2.359	23	7 37 54.13	2.0462	N.20 40 31.6	7.411
THURSDAY 6.					SATURDAY 8.				
0	5 58 35.97	2.1743	N.24 37 24.2	2.476	0	7 39 56.81	2.0433	N.20 33 4.2	7.503
1	6 0 46.36	2.1721	24 34 52.1	2.592	1	7 41 59.32	2.0404	20 25 31.3	7.594
2	6 2 56.62	2.1698	24 32 13.1	2.708	2	7 44 1.66	2.0376	20 17 52.9	7.685
3	6 5 6.74	2.1676	24 29 27.1	2.824	3	7 46 3.83	2.0347	20 10 9.1	7.775
4	6 7 16.73	2.1652	24 26 34.2	2.939	4	7 48 5.83	2.0319	20 2 19.9	7.864
5	6 9 26.57	2.1628	24 23 34.4	3.053	5	7 50 7.66	2.0292	19 54 25.4	7.953
6	6 11 36.27	2.1604	24 20 27.8	3.168	6	7 52 9.33	2.0264	19 46 25.5	8.042
7	6 13 45.82	2.1580	24 17 14.3	3.282	7	7 54 10.83	2.0236	19 38 20.4	8.129
8	6 15 55.23	2.1555	24 13 54.0	3.395	8	7 56 12.16	2.0208	19 30 10.0	8.217
9	6 18 4.48	2.1530	24 10 26.9	3.507	9	7 58 13.33	2.0182	19 21 54.4	8.303
10	6 20 13.59	2.1506	24 6 53.1	3.619	10	8 0 14.34	2.0154	19 13 33.6	8.389
11	6 22 22.55	2.1480	24 3 12.6	3.731	11	8 2 15.18	2.0127	19 5 7.7	8.474
12	6 24 31.35	2.1453	23 59 25.4	3.842	12	8 4 15.86	2.0100	18 56 36.7	8.558
13	6 26 39.99	2.1428	23 55 31.5	3.953	13	8 6 16.38	2.0074	18 48 0.7	8.643
14	6 28 48.48	2.1402	23 51 31.0	4.064	14	8 8 16.75	2.0047	18 39 19.6	8.727
15	6 30 56.81	2.1375	23 47 23.8	4.174	15	8 10 16.95	2.0021	18 30 33.5	8.809
16	6 33 4.98	2.1348	23 43 10.1	4.283	16	8 12 17.00	1.9996	18 21 42.5	8.891
17	6 35 12.99	2.1321	23 38 49.8	4.392	17	8 14 16.90	1.9970	18 12 46.6	8.972
18	6 37 20.83	2.1293	23 34 23.0	4.501	18	8 16 16.64	1.9944	18 3 45.8	9.053
19	6 39 28.51	2.1267	23 29 49.7	4.609	19	8 18 16.23	1.9920	17 54 40.2	9.134
20	6 41 36.03	2.1239	23 25 9.9	4.717	20	8 20 15.68	1.9895	17 45 29.7	9.214
21	6 43 43.38	2.1211	23 20 23.7	4.825	21	8 22 14.97	1.9870	17 36 14.5	9.295
22	6 45 50.56	2.1183	23 15 31.1	4.930	22	8 24 14.12	1.9846	17 26 54.5	9.372
23	6 47 57.58	2.1156	23 10 32.1	5.036	23	8 26 13.12	1.9822	17 17 29.8	9.450
24	6 50 4.43	2.1127	N.23 5 26.8	5.141	24	8 28 11.98	1.9798	N.17 8 0.5	9.527

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 9.					TUESDAY 11.				
0	8 28 11.98	1.9798	N. 17 8 0.5	9.527	0	10 1 14.20	1.9141	N. 8 13 35.8	12.488
1	8 30 10.70	1.9775	16 58 26.6	9.604	1	10 2 9.04	1.9139	8 1 5.2	12.533
2	8 32 9.28	1.9758	16 48 48.0	9.681	2	10 5 3.87	1.9138	7 48 31.8	12.578
3	8 34 7.72	1.9739	16 39 4.9	9.755	3	10 6 58.70	1.9137	7 35 55.8	12.622
4	8 36 6.03	1.9707	16 29 17.4	9.830	4	10 8 53.52	1.9138	7 23 17.2	12.664
5	8 38 4.21	1.9686	16 19 25.3	9.905	5	10 10 48.35	1.9139	7 10 36.1	12.707
6	8 40 2.26	1.9663	16 9 28.8	9.978	6	10 12 43.19	1.9140	6 57 52.4	12.748
7	8 42 0.17	1.9642	15 59 27.9	10.052	7	10 14 38.03	1.9141	6 45 6.3	12.788
8	8 43 57.96	1.9621	15 49 22.6	10.124	8	10 16 32.88	1.9143	6 32 17.8	12.828
9	8 45 55.62	1.9600	15 39 13.0	10.196	9	10 18 27.75	1.9147	6 19 26.9	12.867
10	8 47 53.16	1.9580	15 28 59.1	10.267	10	10 20 22.64	1.9151	6 6 33.7	12.906
11	8 49 50.58	1.9560	15 18 41.0	10.337	11	10 22 17.56	1.9155	5 53 38.2	12.944
12	8 51 47.88	1.9541	15 8 18.7	10.407	12	10 24 12.50	1.9159	5 40 40.4	12.981
13	8 53 45.07	1.9522	14 57 52.2	10.476	13	10 26 7.47	1.9165	5 27 40.5	13.017
14	8 55 42.14	1.9503	14 47 21.6	10.544	14	10 28 2.48	1.9171	5 14 38.4	13.053
15	8 57 39.10	1.9485	14 36 46.9	10.613	15	10 29 57.52	1.9177	5 1 34.2	13.087
16	8 59 35.96	1.9467	14 26 8.1	10.681	16	10 31 52.60	1.9184	4 48 28.0	13.120
17	9 1 32.71	1.9449	14 15 25.2	10.748	17	10 33 47.73	1.9192	4 35 19.8	13.153
18	9 3 29.35	1.9432	14 4 38.4	10.813	18	10 35 42.91	1.9201	4 22 9.6	13.186
19	9 5 25.89	1.9416	13 53 47.7	10.878	19	10 37 38.14	1.9209	4 8 57.5	13.217
20	9 7 22.34	1.9400	13 42 53.0	10.943	20	10 39 33.42	1.9218	3 55 43.6	13.247
21	9 9 18.69	1.9384	13 31 54.5	11.008	21	10 41 28.76	1.9229	3 42 27.9	13.277
22	9 11 14.95	1.9368	13 20 52.1	11.072	22	10 43 24.17	1.9240	3 29 10.4	13.305
23	9 13 11.11	1.9353	N. 13 9 45.9	11.134	23	10 45 19.64	1.9252	N. 3 15 51.3	13.333
MONDAY 10.					WEDNESDAY 12.				
0	9 15 7.19	1.9339	N. 12 58 36.0	11.196	0	10 47 15.19	1.9264	N. 3 2 30.5	13.360
1	9 17 3.18	1.9325	12 47 22.4	11.258	1	10 49 10.81	1.9277	2 49 8.1	13.386
2	9 18 59.09	1.9312	12 36 5.1	11.319	2	10 51 6.51	1.9290	2 35 44.2	13.412
3	9 20 54.92	1.9298	12 24 44.1	11.379	3	10 53 2.29	1.9303	2 22 18.7	13.437
4	9 22 50.67	1.9286	12 13 19.6	11.438	4	10 54 58.15	1.9318	2 8 51.8	13.459
5	9 24 46.35	1.9274	12 1 51.5	11.497	5	10 56 54.10	1.9333	1 55 23.6	13.482
6	9 26 41.96	1.9262	11 50 19.9	11.556	6	10 58 50.15	1.9349	1 41 54.0	13.503
7	9 28 37.50	1.9251	11 38 44.8	11.613	7	11 0 46.29	1.9365	1 28 23.2	13.524
8	9 30 32.97	1.9240	11 27 6.3	11.670	8	11 2 42.53	1.9383	1 14 51.1	13.545
9	9 32 28.38	1.9231	11 15 24.4	11.727	9	11 4 38.88	1.9401	1 1 17.8	13.563
10	9 34 23.74	1.9222	11 3 39.1	11.782	10	11 6 35.34	1.9419	0 47 43.5	13.581
11	9 36 19.04	1.9212	10 51 50.5	11.837	11	11 8 31.91	1.9438	0 34 8.1	13.598
12	9 38 14.28	1.9203	10 39 58.6	11.892	12	11 10 28.60	1.9458	0 20 31.7	13.614
13	9 40 9.47	1.9193	10 28 3.5	11.945	13	11 12 25.41	1.9479	N. 0 6 54.4	13.630
14	9 42 4.62	1.9187	10 16 5.2	11.998	14	11 14 22.35	1.9500	S. 0 6 43.9	13.644
15	9 43 59.72	1.9180	10 4 3.8	12.050	15	11 16 19.41	1.9521	0 20 22.9	13.657
16	9 45 54.78	1.9174	9 51 59.2	12.102	16	11 18 16.60	1.9543	0 34 2.7	13.670
17	9 47 49.81	1.9168	9 39 51.6	12.154	17	11 20 13.93	1.9567	0 47 43.3	13.682
18	9 49 44.80	1.9162	9 27 40.9	12.202	18	11 22 11.40	1.9590	1 1 24.5	13.692
19	9 51 39.76	1.9157	9 15 27.3	12.252	19	11 24 9.01	1.9614	1 15 6.3	13.701
20	9 53 34.69	1.9153	9 3 10.7	12.301	20	11 26 6.77	1.9639	1 28 48.6	13.709
21	9 55 29.60	1.9149	8 50 51.2	12.348	21	11 28 4.68	1.9665	1 42 31.4	13.717
22	9 57 24.48	1.9146	8 38 28.9	12.396	22	11 30 2.75	1.9691	1 56 14.6	13.723
23	9 59 19.35	1.9143	8 26 3.7	12.442	23	11 32 0.97	1.9717	2 9 58.1	13.728
24	10 1 14.20	1.9141	N. 8 13 35.8	12.488	24	11 33 59.35	1.9745	S. 2 23 41.9	13.732

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 13.					SATURDAY 15.				
0	11 33 59.35	1.9745	S. 2 23 41.9	13.738	0	13 13 8.29	2.1794	S. 13 5 25.5	12.510
1	11 35 57.91	1.9773	2 37 25.9	13.735	1	13 15 19.22	2.1850	13 17 54.4	12.458
2	11 37 56.63	1.9802	2 51 10.1	13.737	2	13 17 30.49	2.1906	13 30 19.7	12.391
3	11 39 55.53	1.9832	3 4 54.4	13.738	3	13 19 42.09	2.1963	13 42 41.3	12.328
4	11 41 54.61	1.9862	3 18 38.7	13.738	4	13 21 54.04	2.2020	13 54 59.1	12.265
5	11 43 53.88	1.9893	3 32 22.9	13.737	5	13 24 6.33	2.2077	14 7 13.1	12.200
6	11 45 53.33	1.9924	3 46 7.1	13.735	6	13 26 18.97	2.2135	14 19 23.1	12.133
7	11 47 52.97	1.9956	3 59 51.1	13.732	7	13 28 31.95	2.2193	14 31 29.1	12.066
8	11 49 52.80	1.9988	4 13 34.9	13.727	8	13 30 45.29	2.2252	14 43 31.0	11.996
9	11 51 52.83	2.0022	4 27 18.3	13.721	9	13 32 58.98	2.2311	14 55 28.6	11.924
10	11 53 53.06	2.0056	4 41 1.4	13.714	10	13 35 13.02	2.2370	15 7 21.9	11.852
11	11 55 53.50	2.0091	4 54 44.0	13.706	11	13 37 27.42	2.2429	15 19 10.8	11.777
12	11 57 54.15	2.0127	5 8 26.1	13.697	12	13 39 42.17	2.2488	15 30 55.1	11.701
13	11 59 55.02	2.0162	5 22 7.6	13.687	13	13 41 57.28	2.2549	15 42 34.9	11.623
14	12 1 56.10	2.0198	5 35 48.5	13.675	14	13 44 12.76	2.2609	15 54 9.9	11.543
15	12 3 57.40	2.0236	5 49 28.6	13.663	15	13 46 28.59	2.2669	16 5 40.1	11.463
16	12 5 58.93	2.0274	6 3 8.0	13.649	16	13 48 44.79	2.2730	16 17 5.5	11.381
17	12 8 0.69	2.0312	6 16 46.5	13.633	17	13 51 1.35	2.2791	16 28 25.8	11.297
18	12 10 2.68	2.0351	6 30 24.0	13.617	18	13 53 18.28	2.2852	16 39 41.1	11.212
19	12 12 4.90	2.0391	6 44 0.6	13.600	19	13 55 35.58	2.2913	16 50 51.2	11.125
20	12 14 7.37	2.0432	6 57 36.0	13.581	20	13 57 53.24	2.2974	17 1 56.1	11.037
21	12 16 10.08	2.0472	7 11 10.3	13.561	21	14 0 11.27	2.3036	17 12 55.6	10.946
22	12 18 13.03	2.0513	7 24 43.3	13.539	22	14 2 29.67	2.3097	17 23 49.6	10.853
23	12 20 16.24	2.0556	S. 7 38 15.0	13.517	23	14 4 48.44	2.3159	S. 17 34 38.0	10.760
FRIDAY 14.					SUNDAY 16.				
0	12 22 19.70	2.0598	S. 7 51 45.4	13.493	0	14 7 7.58	2.3221	S. 17 45 20.8	10.665
1	12 24 23.42	2.0642	8 5 14.2	13.468	1	14 9 27.09	2.3282	17 55 57.8	10.568
2	12 26 27.40	2.0686	8 18 41.5	13.442	2	14 11 46.97	2.3343	18 6 29.0	10.471
3	12 28 31.65	2.0731	8 32 7.2	13.414	3	14 14 7.21	2.3404	18 16 54.3	10.371
4	12 30 36.17	2.0776	8 45 31.2	13.385	4	14 16 27.82	2.3467	18 27 13.5	10.269
5	12 32 40.96	2.0822	8 58 53.4	13.354	5	14 18 48.81	2.3529	18 37 26.6	10.166
6	12 34 46.03	2.0868	9 12 13.7	13.322	6	14 21 10.17	2.3590	18 47 33.4	10.062
7	12 36 51.38	2.0915	9 25 32.1	13.289	7	14 23 31.89	2.3651	18 57 34.0	9.956
8	12 38 57.01	2.0963	9 38 48.4	13.255	8	14 25 53.98	2.3712	19 7 28.1	9.848
9	12 41 2.93	2.1011	9 52 2.7	13.219	9	14 28 16.44	2.3773	19 17 15.7	9.738
10	12 43 9.14	2.1059	10 5 14.7	13.182	10	14 30 39.26	2.3834	19 26 56.7	9.627
11	12 45 15.64	2.1108	10 18 24.5	13.143	11	14 33 2.45	2.3894	19 36 31.0	9.515
12	12 47 22.44	2.1158	10 31 31.9	13.103	12	14 35 25.99	2.3954	19 45 58.5	9.401
13	12 49 29.54	2.1208	10 44 36.9	13.062	13	14 37 49.90	2.4016	19 55 19.1	9.285
14	12 51 36.94	2.1259	10 57 39.3	13.018	14	14 40 14.18	2.4077	20 4 32.7	9.168
15	12 53 44.65	2.1311	11 10 39.1	12.974	15	14 42 38.82	2.4136	20 13 39.3	9.050
16	12 55 52.67	2.1362	11 23 36.2	12.929	16	14 45 3.81	2.4195	20 22 38.7	8.929
17	12 58 1.00	2.1414	11 36 30.6	12.882	17	14 47 29.16	2.4254	20 31 30.8	8.808
18	13 0 9.64	2.1467	11 49 22.0	12.833	18	14 49 54.86	2.4313	20 40 15.6	8.685
19	13 2 18.60	2.1521	12 2 10.5	12.783	19	14 52 20.91	2.4371	20 48 53.0	8.560
20	13 4 27.89	2.1575	12 14 56.0	12.732	20	14 54 47.31	2.4428	20 57 22.8	8.433
21	13 6 37.50	2.1628	12 27 38.3	12.678	21	14 57 14.05	2.4486	21 5 45.0	8.307
22	13 8 47.43	2.1683	12 40 17.4	12.624	22	14 59 41.14	2.4543	21 13 59.6	8.178
23	13 10 57.69	2.1738	12 52 53.2	12.568	23	15 2 8.57	2.4599	21 22 6.4	8.047
24	13 13 8.29	2.1794	S. 13 5 25.5	12.510	24	15 4 36.33	2.4655	S. 21 30 5.3	7.915

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 17.					WEDNESDAY 19.				
0	15 4 36.33	2.4655	S. 21 30 5.3	7.915	0	17 7 46.46	2.6236	S. 24 55 49.0	0.331
1	15 7 4.43	2.4711	21 37 56.2	7.782	1	17 10 23.89	2.6238	24 56 3.7	- 0.158
2	15 9 32.86	2.4765	21 45 39.1	7.647	2	17 13 1.32	2.6238	24 56 8.0	+ 0.024
3	15 12 1.61	2.4819	21 53 13.9	7.511	3	17 15 38.75	2.6238	24 56 2.0	0.187
4	15 14 30.69	2.4873	22 0 40.4	7.373	4	17 18 16.17	2.6236	24 55 45.6	0.399
5	15 17 0.09	2.4926	22 7 58.7	7.235	5	17 20 53.58	2.6233	24 55 18.9	0.538
6	15 19 29.80	2.4978	22 15 8.6	7.095	6	17 23 30.97	2.6228	24 54 41.8	0.704
7	15 21 59.83	2.5030	22 22 10.1	6.953	7	17 26 8.32	2.6222	24 53 54.4	0.876
8	15 24 30.16	2.5080	22 29 3.0	6.810	8	17 28 45.64	2.6215	24 52 56.7	1.048
9	15 27 0.79	2.5130	22 35 47.3	6.667	9	17 31 22.90	2.6206	24 51 48.6	1.220
10	15 29 31.72	2.5179	22 42 23.0	6.522	10	17 34 0.11	2.6197	24 50 30.3	1.398
11	15 32 2.94	2.5227	22 48 49.9	6.375	11	17 36 37.26	2.6185	24 49 1.6	1.563
12	15 34 34.45	2.5275	22 55 8.0	6.227	12	17 39 14.33	2.6172	24 47 22.7	1.733
13	15 37 6.24	2.5322	23 1 17.2	6.078	13	17 41 51.32	2.6158	24 45 33.6	1.904
14	15 39 38.31	2.5368	23 7 17.4	5.928	14	17 44 28.22	2.6142	24 43 34.2	2.075
15	15 42 10.65	2.5412	23 13 8.5	5.777	15	17 47 5.02	2.6124	24 41 24.6	2.245
16	15 44 43.25	2.5455	23 18 50.6	5.625	16	17 49 41.71	2.6106	24 39 4.8	2.414
17	15 47 16.11	2.5498	23 24 23.5	5.471	17	17 52 18.29	2.6087	24 36 34.9	2.583
18	15 49 49.23	2.5540	23 29 47.1	5.317	18	17 54 54.75	2.6066	24 33 54.9	2.751
19	15 52 22.59	2.5581	23 35 1.5	5.162	19	17 57 31.08	2.6044	24 31 4.8	2.918
20	15 54 56.20	2.5621	23 40 6.5	5.004	20	18 0 7.28	2.6022	24 28 4.7	3.086
21	15 57 30.04	2.5659	23 45 2.0	4.847	21	18 2 43.34	2.5997	24 24 54.5	3.252
22	16 0 4.11	2.5697	23 49 48.1	4.689	22	18 5 19.24	2.5970	24 21 34.4	3.418
23	16 2 38.40	2.5733	S. 23 54 24.7	4.529	23	18 7 54.98	2.5943	S. 24 18 4.3	3.584
TUESDAY 18.					THURSDAY 20.				
0	16 5 12.91	2.5769	S. 23 58 51.6	4.368	0	18 10 30.56	2.5915	S. 24 14 24.3	3.749
1	16 7 47.63	2.5803	24 3 8.9	4.207	1	18 13 5.96	2.5886	24 10 34.4	3.913
2	16 10 22.55	2.5836	24 7 16.5	4.045	2	18 15 41.19	2.5856	24 6 34.7	4.076
3	16 12 57.66	2.5867	24 11 14.3	3.882	3	18 18 16.23	2.5824	24 2 25.3	4.238
4	16 15 32.96	2.5898	24 15 2.4	3.719	4	18 20 51.08	2.5792	23 58 6.1	4.400
5	16 18 8.44	2.5927	24 18 40.6	3.554	5	18 23 25.73	2.5758	23 53 37.3	4.560
6	16 20 44.09	2.5956	24 22 8.9	3.389	6	18 26 0.18	2.5723	23 48 58.9	4.720
7	16 23 19.91	2.5983	24 25 27.3	3.223	7	18 28 34.41	2.5688	23 44 10.9	4.880
8	16 25 55.89	2.6009	24 28 35.7	3.057	8	18 31 8.43	2.5652	23 39 13.3	5.038
9	16 28 32.02	2.6033	24 31 34.1	2.890	9	18 33 42.23	2.5614	23 34 6.3	5.194
10	16 31 8.29	2.6056	24 34 22.5	2.722	10	18 36 15.80	2.5575	23 28 50.0	5.350
11	16 33 44.69	2.6077	24 37 0.8	2.554	11	18 38 49.13	2.5535	23 23 24.3	5.506
12	16 36 21.22	2.6098	24 39 29.0	2.385	12	18 41 22.22	2.5495	23 17 49.3	5.660
13	16 38 57.87	2.6117	24 41 47.0	2.216	13	18 43 55.07	2.5453	23 12 5.1	5.813
14	16 41 34.63	2.6135	24 43 54.9	2.046	14	18 46 27.66	2.5411	23 6 11.7	5.966
15	16 44 11.49	2.6152	24 45 52.5	1.875	15	18 49 0.00	2.5368	23 0 9.2	6.117
16	16 46 48.45	2.6167	24 47 39.9	1.705	16	18 51 32.08	2.5325	22 53 57.7	6.266
17	16 49 25.49	2.6180	24 49 17.1	1.534	17	18 54 3.90	2.5281	22 47 37.3	6.414
18	16 52 2.61	2.6192	24 50 44.0	1.363	18	18 56 35.45	2.5236	22 41 8.0	6.562
19	16 54 39.79	2.6202	24 52 0.6	1.191	19	18 59 6.73	2.5190	22 34 29.8	6.709
20	16 57 17.04	2.6212	24 53 6.9	1.019	20	19 1 37.73	2.5143	22 27 42.9	6.854
21	16 59 54.34	2.6220	24 54 2.9	0.848	21	19 4 8.45	2.5097	22 20 47.3	6.998
22	17 2 31.68	2.6227	24 54 48.6	0.676	22	19 6 38.89	2.5049	22 13 43.1	7.141
23	17 5 9.06	2.6232	24 55 24.0	0.503	23	19 9 9.04	2.5000	22 6 30.4	7.282
24	17 7 46.46	2.6236	S. 24 55 49.0	0.331	24	19 11 38.89	2.4951	S. 21 59 9.2	7.423

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 21.					SUNDAY 23.				
0	19 11 38.89	2.4951	S. 21 59 9.2	7.483	0	21 5 18.10	2.2479	S. 13 47 2.9	12.589
1	19 14 8.45	2.4901	21 51 39.6	7.564	1	21 7 32.47	2.2372	13 34 29.0	12.599
2	19 16 37.70	2.4851	21 44 1.7	7.700	2	21 9 46.56	2.2345	13 21 51.0	12.668
3	19 19 6.66	2.4801	21 36 15.6	7.837	3	21 12 0.37	2.2278	13 9 8.8	12.737
4	19 21 35.31	2.4750	21 28 21.3	7.973	4	21 14 13.89	2.2231	12 56 22.6	12.803
5	19 24 3.66	2.4698	21 20 18.9	8.107	5	21 16 27.14	2.2185	12 43 32.4	12.868
6	19 26 31.69	2.4646	21 12 8.5	8.239	6	21 18 40.11	2.2139	12 30 38.4	12.932
7	19 28 59.41	2.4594	21 3 50.2	8.370	7	21 20 52.81	2.2094	12 17 40.6	12.994
8	19 31 26.82	2.4542	20 55 24.1	8.500	8	21 23 5.24	2.2050	12 4 39.1	13.055
9	19 33 53.91	2.4488	20 46 50.2	8.629	9	21 25 17.41	2.2007	11 51 34.0	13.114
10	19 36 20.68	2.4436	20 38 8.6	8.757	10	21 27 29.32	2.1963	11 38 25.4	13.172
11	19 38 47.14	2.4382	20 29 19.4	8.883	11	21 29 40.97	2.1920	11 25 13.4	13.228
12	19 41 13.27	2.4328	20 20 22.6	9.007	12	21 31 52.36	2.1876	11 11 58.0	13.284
13	19 43 39.08	2.4275	20 11 18.5	9.130	13	21 34 3.50	2.1837	10 58 39.3	13.337
14	19 46 4.57	2.4221	20 2 7.0	9.252	14	21 36 14.40	2.1796	10 45 17.5	13.389
15	19 48 29.73	2.4166	19 52 48.2	9.372	15	21 38 25.05	2.1755	10 31 52.6	13.441
16	19 50 54.56	2.4111	19 43 22.3	9.491	16	21 40 35.46	2.1716	10 18 24.6	13.491
17	19 53 19.06	2.4057	19 33 49.3	9.608	17	21 42 45.64	2.1677	10 4 53.7	13.538
18	19 55 43.24	2.4002	19 24 9.3	9.725	18	21 44 55.58	2.1638	9 51 20.0	13.585
19	19 58 7.09	2.3947	19 14 22.3	9.840	19	21 47 5.29	2.1599	9 37 43.5	13.630
20	20 0 30.61	2.3892	19 4 28.5	9.953	20	21 49 14.77	2.1562	9 24 4.4	13.674
21	20 2 53.80	2.3837	18 54 28.0	10.064	21	21 51 24.03	2.1525	9 10 22.6	13.717
22	20 5 16.66	2.3783	18 44 20.8	10.175	22	21 53 33.07	2.1489	8 56 38.3	13.758
23	20 7 39.20	2.3728	S. 18 34 7.0	10.284	23	21 55 41.90	2.1454	S. 8 42 51.6	13.798
SATURDAY 22.					MONDAY 24.				
0	20 10 1.40	2.3673	S. 18 23 46.7	10.391	0	21 57 50.52	2.1419	S. 8 29 2.5	13.837
1	20 12 23.27	2.3618	18 13 20.1	10.497	1	21 59 58.93	2.1383	8 15 11.2	13.874
2	20 14 44.82	2.3564	18 2 47.1	10.602	2	22 2 7.14	2.1352	8 1 17.6	13.911
3	20 17 6.04	2.3509	17 52 7.9	10.704	3	22 4 15.15	2.1319	7 47 21.9	13.945
4	20 19 26.93	2.3454	17 41 22.6	10.806	4	22 6 22.97	2.1287	7 33 24.2	13.977
5	20 21 47.49	2.3400	17 30 31.2	10.906	5	22 8 30.59	2.1255	7 19 24.6	14.009
6	20 24 7.73	2.3347	17 19 33.9	11.004	6	22 10 38.03	2.1224	7 5 23.1	14.041
7	20 26 27.65	2.3292	17 8 30.7	11.102	7	22 12 45.28	2.1193	6 51 19.7	14.070
8	20 28 47.24	2.3238	16 57 21.7	11.198	8	22 14 52.35	2.1164	6 37 14.7	14.098
9	20 31 6.51	2.3183	16 46 7.0	11.292	9	22 16 59.25	2.1135	6 23 8.0	14.125
10	20 33 25.46	2.3132	16 34 46.7	11.384	10	22 19 5.97	2.1107	6 8 59.7	14.150
11	20 35 44.09	2.3078	16 23 20.9	11.476	11	22 21 12.53	2.1079	5 54 50.0	14.173
12	20 38 2.40	2.3026	16 11 49.6	11.566	12	22 23 18.92	2.1052	5 40 38.9	14.196
13	20 40 20.40	2.2973	16 0 13.0	11.653	13	22 25 25.15	2.1026	5 26 26.5	14.217
14	20 42 38.08	2.2921	15 48 31.2	11.740	14	22 27 31.23	2.1001	5 12 12.8	14.238
15	20 44 55.45	2.2869	15 36 44.2	11.826	15	22 29 37.16	2.0976	4 57 58.0	14.257
16	20 47 12.51	2.2818	15 24 52.1	11.910	16	22 31 42.94	2.0952	4 43 42.0	14.274
17	20 49 29.26	2.2767	15 12 55.0	11.992	17	22 33 48.58	2.0928	4 29 25.1	14.290
18	20 51 45.71	2.2716	15 0 53.0	12.073	18	22 35 54.08	2.0906	4 15 7.2	14.305
19	20 54 1.85	2.2665	14 48 46.2	12.153	19	22 37 59.45	2.0883	4 0 48.5	14.319
20	20 56 17.69	2.2613	14 36 34.6	12.232	20	22 40 4.68	2.0862	3 46 28.9	14.332
21	20 58 33.23	2.2566	14 24 18.4	12.308	21	22 42 9.79	2.0842	3 32 8.7	14.342
22	21 0 48.48	2.2517	14 11 57.7	12.383	22	22 44 14.78	2.0822	3 17 47.8	14.352
23	21 3 3.44	2.2468	13 59 32.5	12.457	23	22 46 19.65	2.0802	3 3 26.4	14.361
24	21 5 18.10	2.2419	S. 13 47 2.9	12.529	24	22 48 24.40	2.0783	S. 2 49 4.5	14.368

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 25.					THURSDAY 27.				
0	22 48 24.40	2.0783	S. 2 49 4.5	14.368	0	0 27 15.12	2.0637	N. 8 26 11.0	13.318
1	22 50 29.04	2.0765	2 34 42.2	14.375	1	0 29 18.97	2.0648	8 39 28.6	13.267
2	22 52 33.58	2.0748	2 20 19.5	14.380	2	0 31 22.89	2.0659	8 52 43.1	13.217
3	22 54 38.02	2.0732	2 5 56.6	14.383	3	0 33 26.88	2.0671	9 5 54.6	13.166
4	22 56 42.36	2.0716	1 51 33.5	14.386	4	0 35 30.94	2.0683	9 19 3.0	13.113
5	22 58 46.61	2.0700	1 37 10.3	14.387	5	0 37 35.07	2.0695	9 32 8.1	13.058
6	23 0 50.76	2.0685	1 22 47.0	14.387	6	0 39 39.28	2.0708	9 45 9.9	13.002
7	23 2 54.83	2.0671	1 8 23.8	14.386	7	0 41 43.57	2.0722	9 58 8.3	12.946
8	23 4 58.81	2.0658	0 54 0.7	14.383	8	0 43 47.94	2.0735	10 11 3.4	12.889
9	23 7 2.72	2.0646	0 39 37.8	14.379	9	0 45 52.40	2.0751	10 23 55.0	12.830
10	23 9 6.56	2.0633	0 25 15.2	14.374	10	0 47 56.95	2.0765	10 36 43.0	12.771
11	23 11 10.32	2.0622	S. 0 10 52.9	14.368	11	0 50 1.58	2.0780	10 49 27.5	12.710
12	23 13 14.02	2.0612	N. 0 3 29.0	14.361	12	0 52 6.31	2.0796	11 2 8.2	12.648
13	23 15 17.66	2.0602	0 17 50.4	14.353	13	0 54 11.13	2.0812	11 14 45.2	12.586
14	23 17 21.24	2.0592	0 32 11.3	14.343	14	0 56 16.05	2.0828	11 27 18.5	12.522
15	23 19 24.77	2.0583	0 46 31.6	14.332	15	0 58 21.07	2.0845	11 39 47.9	12.457
16	23 21 28.24	2.0575	1 0 51.1	14.319	16	1 0 26.19	2.0862	11 52 13.3	12.391
17	23 23 31.67	2.0568	1 15 9.9	14.307	17	1 2 31.41	2.0879	12 4 34.8	12.325
18	23 25 35.06	2.0562	1 29 27.9	14.292	18	1 4 36.74	2.0897	12 16 52.3	12.257
19	23 27 38.41	2.0556	1 43 44.9	14.276	19	1 6 42.17	2.0915	12 29 5.6	12.189
20	23 29 41.73	2.0550	1 58 1.0	14.259	20	1 8 47.72	2.0933	12 41 14.8	12.117
21	23 31 45.01	2.0545	2 12 16.0	14.241	21	1 10 53.37	2.0952	12 53 19.7	12.046
22	23 33 48.27	2.0541	2 26 29.9	14.222	22	1 12 59.14	2.0971	13 5 20.3	11.974
23	23 35 51.50	2.0537	N. 2 40 42.6	14.202	23	1 15 5.02	2.0989	N. 13 17 16.6	11.902
WEDNESDAY 26.					FRIDAY 28.				
0	23 37 54.71	2.0534	N. 2 54 54.1	14.180	0	1 17 11.01	2.1008	N. 13 29 8.5	11.828
1	23 39 57.91	2.0538	3 9 4.2	14.157	1	1 19 17.12	2.1028	13 40 56.0	11.753
2	23 42 1.09	2.0539	3 23 12.9	14.133	2	1 21 23.36	2.1049	13 52 38.9	11.677
3	23 44 4.26	2.0528	3 37 20.2	14.108	3	1 23 29.71	2.1068	14 4 17.2	11.600
4	23 46 7.43	2.0528	3 51 25.9	14.082	4	1 25 36.18	2.1089	14 15 50.9	11.522
5	23 48 10.60	2.0528	4 5 30.0	14.054	5	1 27 42.78	2.1110	14 27 19.9	11.443
6	23 50 13.77	2.0529	4 19 32.4	14.025	6	1 29 49.50	2.1132	14 38 44.1	11.365
7	23 52 16.95	2.0531	4 33 33.0	13.996	7	1 31 56.35	2.1152	14 50 3.5	11.285
8	23 54 20.14	2.0532	4 47 31.9	13.966	8	1 34 3.33	2.1173	15 1 18.1	11.202
9	23 56 23.34	2.0534	5 1 28.9	13.933	9	1 36 10.43	2.1194	15 12 27.7	11.118
10	23 58 26.55	2.0537	5 15 23.9	13.900	10	1 38 17.66	2.1216	15 23 32.3	11.034
11	0 0 29.78	2.0541	5 29 16.9	13.866	11	1 40 25.02	2.1237	15 34 31.8	10.949
12	0 2 33.04	2.0545	5 43 7.8	13.831	12	1 42 32.51	2.1259	15 45 26.2	10.864
13	0 4 36.32	2.0549	5 56 56.6	13.794	13	1 44 40.13	2.1282	15 56 15.5	10.778
14	0 6 39.63	2.0555	6 10 43.1	13.756	14	1 46 47.89	2.1304	16 6 59.6	10.691
15	0 8 42.98	2.0561	6 24 27.3	13.717	15	1 48 55.78	2.1326	16 17 38.4	10.602
16	0 10 46.36	2.0567	6 38 9.2	13.677	16	1 51 3.80	2.1348	16 28 11.9	10.513
17	0 12 49.78	2.0571	6 51 48.6	13.636	17	1 53 11.96	2.1371	16 38 40.0	10.423
18	0 14 53.25	2.0582	7 5 25.5	13.594	18	1 55 20.25	2.1395	16 49 2.7	10.332
19	0 16 56.76	2.0589	7 18 59.9	13.551	19	1 57 28.68	2.1418	16 59 19.9	10.241
20	0 19 0.32	2.0597	7 32 31.6	13.507	20	1 59 37.24	2.1438	17 9 31.6	10.148
21	0 21 3.93	2.0607	7 46 0.7	13.462	21	2 1 45.93	2.1460	17 19 37.7	10.054
22	0 23 7.60	2.0617	7 59 27.0	13.414	22	2 3 54.76	2.1482	17 29 38.1	9.959
23	0 25 11.33	2.0627	8 12 50.4	13.367	23	2 6 3.72	2.1505	17 39 32.8	9.864
24	0 27 15.12	2.0637	N. 8 26 11.0	13.318	24	2 8 12.82	2.1528	N. 17 49 21.8	9.768

### THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 29.					MONDAY 31.				
0	2 8 12.82	2.1528	N.17 49 21.8	9.768	0	3 53 49.12	2.2354	N.23 34 5.1	4.375
1	2 10 22.06	2.1551	17 59 5.0	9.678	1	3 56 3.25	2.2358	23 38 23.9	4.251
2	2 12 31.43	2.1573	18 8 42.4	9.574	2	3 58 17.42	2.2364	23 42 35.2	4.122
3	2 14 40.93	2.1595	18 18 13.9	9.476	3	4 0 31.62	2.2370	23 46 39.1	4.003
4	2 16 50.57	2.1618	18 27 39.5	9.377	4	4 2 45.86	2.2376	23 50 35.6	3.879
5	2 19 0.35	2.1641	18 36 59.1	9.276	5	4 5 0.13	2.2381	23 54 24.6	3.754
6	2 21 10.26	2.1662	18 46 12.6	9.175	6	4 7 14.43	2.2385	23 58 6.1	3.629
7	2 23 20.30	2.1684	18 55 20.1	9.073	7	4 9 28.75	2.2388	24 1 40.1	3.504
8	2 25 30.47	2.1706	19 4 21.4	8.971	8	4 11 43.09	2.2392	24 5 6.6	3.379
9	2 27 40.77	2.1728	19 13 16.6	8.868	9	4 13 57.45	2.2393	24 8 25.6	3.253
10	2 29 51.20	2.1750	19 22 5.6	8.765	10	4 16 11.81	2.2395	24 11 37.0	3.127
11	2 32 1.77	2.1772	19 30 48.4	8.660	11	4 18 26.19	2.2397	24 14 40.9	3.002
12	2 34 12.46	2.1793	19 39 24.8	8.554	12	4 20 40.58	2.2398	24 17 37.3	2.877
13	2 36 23.28	2.1814	19 47 54.9	8.448	13	4 22 54.96	2.2397	24 20 26.1	2.751
14	2 38 34.23	2.1835	19 56 18.6	8.341	14	4 25 9.34	2.2397	24 23 7.4	2.626
15	2 40 45.30	2.1856	20 4 35.8	8.233	15	4 27 23.72	2.2396	24 25 41.2	2.500
16	2 42 56.50	2.1877	20 12 46.6	8.126	16	4 29 38.09	2.2393	24 28 7.4	2.374
17	2 45 7.82	2.1897	20 20 50.9	8.017	17	4 31 52.44	2.2390	24 30 26.1	2.248
18	2 47 19.26	2.1917	20 28 48.6	7.907	18	4 34 6.77	2.2387	24 32 37.2	2.122
19	2 49 30.82	2.1937	20 36 39.7	7.797	19	4 36 21.08	2.2383	24 34 40.8	1.997
20	2 51 42.50	2.1957	20 44 24.2	7.687	20	4 38 35.37	2.2379	24 36 36.8	1.871
21	2 53 54.30	2.1976	20 52 2.1	7.575	21	4 40 49.63	2.2374	24 38 25.3	1.745
22	2 56 6.21	2.1995	20 59 33.2	7.463	22	4 43 3.86	2.2368	24 40 6.2	1.620
23	2 58 18.24	2.2014	N.21 6 57.6	7.350	23	4 45 18.05	2.2362	N.24 41 39.7	1.495
SUNDAY 30.					TUESDAY, NOVEMBER 1.				
0	3 0 30.38	2.2032	N.21 14 15.2	7.237	0	4 47 32.20	2.2355	N.24 43 5.6	1.368
1	3 2 42.63	2.2050	21 21 26.0	7.123					
2	3 4 54.98	2.2068	21 28 29.9	7.008					
3	3 7 7.44	2.2085	21 35 27.0	6.894					
4	3 9 20.00	2.2102	21 42 17.2	6.778					
5	3 11 32.67	2.2119	21 49 0.4	6.662					
6	3 13 45.43	2.2135	21 55 36.7	6.546					
7	3 15 58.29	2.2152	22 2 5.9	6.428					
8	3 18 11.25	2.2167	22 8 28.1	6.311					
9	3 20 24.30	2.2182	22 14 43.2	6.192					
10	3 22 37.43	2.2196	22 20 51.2	6.074					
11	3 24 50.65	2.2211	22 26 52.1	5.956					
12	3 27 3.96	2.2225	22 32 45.9	5.837					
13	3 29 17.35	2.2238	22 38 32.5	5.717					
14	3 31 30.81	2.2250	22 44 11.9	5.597					
15	3 33 44.35	2.2263	22 49 44.1	5.476					
16	3 35 57.97	2.2275	22 55 9.0	5.355					
17	3 38 11.65	2.2286	23 0 26.7	5.234					
18	3 40 25.40	2.2297	23 5 37.1	5.112					
19	3 42 39.21	2.2307	23 10 40.2	4.990					
20	3 44 53.08	2.2317	23 15 35.9	4.868					
21	3 47 7.01	2.2326	23 20 24.3	4.745					
22	3 49 20.99	2.2335	23 25 5.3	4.622					
23	3 51 35.03	2.2344	23 29 38.9	4.498					
24	3 53 49.12	2.2352	N.23 34 5.1	4.375					

PHASES OF THE MOON.				
		d	h	m
☾	Last Quarter	. . . . .	Oct. 7	6 4.7
●	New Moon	. . . . .	15	0 37.3
☾	First Quarter	. . . . .	21 21	9.2
○	Full Moon	. . . . .	29 0	18.2
		d	h	
☾	Apogee	. . . . .	Oct. 7	4.9
☾	Perigee	. . . . .	19	13.9

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	α Aquilæ W.	85 7 13	3145	86 34 28	3157	88 1 29	3168	89 28 16	3183
	Fomalhaut W.	59 51 53	3187	61 18 18	3183	62 44 48	3180	64 11 21	3179
	α Pegasi W.	37 24 53	3014	38 54 48	3000	40 25 1	3089	41 55 27	3081
	Aldebaran E.	42 7 55	2719	40 31 40	2739	38 55 52	2762	37 20 34	2765
	MARS E.	78 51 27	2788	77 16 43	2802	75 42 18	2816	74 8 11	2830
	Pollux E.	83 49 53	2648	82 12 3	2661	80 34 31	2675	78 57 18	2689
2	α Aquilæ W.	96 37 49	3261	98 2 46	3278	99 27 23	3298	100 51 37	3317
	Fomalhaut W.	71 23 52	3193	72 50 10	3193	74 16 21	3205	75 42 24	3213
	α Pegasi W.	49 29 11	2972	50 59 59	2975	52 30 43	2978	54 1 23	2983
	MARS E.	66 22 11	2901	64 49 54	2916	63 17 55	2930	61 46 14	2944
	Pollux E.	70 56 0	2762	69 20 42	2777	67 45 44	2791	66 11 4	2806
	Regulus E.	107 47 50	2733	106 11 54	2746	104 36 15	2760	103 0 54	2773
3	Fomalhaut W.	82 50 16	3257	84 15 18	3268	85 40 7	3278	87 4 44	3290
	α Pegasi W.	61 33 2	3014	63 2 57	3022	64 32 43	3030	66 2 19	3038
	MARS E.	54 12 12	3012	52 42 14	3026	51 12 33	3039	49 43 8	3051
	Pollux E.	58 22 33	2879	56 49 47	2894	55 17 20	2909	53 45 12	2923
	Regulus E.	95 8 32	2838	93 34 54	2852	92 1 33	2864	90 28 28	2876
4	Fomalhaut W.	94 4 25	3350	95 27 39	3363	96 50 38	3376	98 13 22	3390
	α Pegasi W.	73 27 47	3079	74 56 22	3088	76 24 46	3096	77 53 0	3105
	α Arietis W.	29 57 41	2996	31 27 59	3001	32 58 11	3005	34 28 17	3011
	MARS E.	42 19 50	3111	40 51 54	3122	39 24 11	3133	37 56 42	3143
	Pollux E.	46 9 5	2995	44 38 46	3010	43 8 46	3025	41 39 4	3040
	Regulus E.	82 46 51	2934	81 15 15	2945	79 43 53	2955	78 12 44	2965
	SUN E.	125 35 27	3314	124 11 32	3325	122 47 49	3335	121 24 18	3345
5	α Pegasi W.	85 11 43	3143	86 39 0	3151	88 6 8	3158	89 33 8	3165
	α Arietis W.	41 57 2	3039	43 26 26	3045	44 55 43	3051	46 24 53	3056
	Pollux E.	34 15 21	3120	32 47 36	3139	31 20 14	3158	29 53 15	3176
	Regulus E.	70 40 2	3011	69 10 3	3018	67 40 13	3026	66 10 33	3034
	SUN E.	114 29 34	3392	113 7 8	3400	111 44 51	3408	110 22 43	3415
6	α Arietis W.	53 49 17	3077	55 17 55	3080	56 46 29	3082	58 15 0	3085
	Aldebaran W.	22 17 10	3372	23 39 59	3138	25 3 26	3173	26 27 23	3200
	Regulus E.	58 44 17	3064	57 15 23	3069	55 46 35	3073	54 17 52	3077
	SUN E.	103 33 55	3445	102 12 29	3448	100 51 7	3453	99 29 50	3455
7	α Arietis W.	65 37 0	3091	67 5 20	3091	68 33 41	3091	70 2 2	3089
	Aldebaran W.	33 32 29	3218	34 58 17	3107	36 24 18	3198	37 50 30	3189
	Regulus E.	46 55 18	3090	45 26 56	3091	43 58 35	3092	42 30 16	3093
	SUN E.	92 44 10	3465	91 23 7	3466	90 2 5	3466	88 41 3	3465
8	α Arietis W.	77 24 19	3078	78 52 56	3073	80 21 38	3069	81 50 25	3065
	Aldebaran W.	45 4 0	3148	46 31 11	3141	47 58 31	3132	49 26 2	3124
	Regulus E.	35 8 46	3092	33 40 27	3091	32 12 7	3090	30 43 45	3090
	SUN E.	81 55 29	3454	80 34 14	3450	79 12 54	3446	77 51 30	3441
9	α Arietis W.	89 15 58	3034	90 45 28	3028	92 15 6	3020	93 44 54	3022
	Aldebaran W.	56 46 5	3081	58 14 38	3072	59 43 22	3063	61 12 17	3052
	SUN E.	71 2 57	3411	69 40 53	3403	68 18 40	3395	66 56 18	3386



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	<i>α</i> Aquilæ W.	90 54 46	3197	92 20 59	3211	93 46 55	3227	95 12 32	3244
	Fomalhaut W.	65 37 55	3180	67 4 28	3181	68 31 0	3184	69 57 28	3188
	<i>α</i> Pegasi W.	43 26 3	2976	44 56 46	2973	46 27 33	2971	47 58 22	2971
	Aldebaran E.	35 45 46	2809	34 11 30	2836	32 37 49	2864	31 4 44	2894
	Mars E.	72 34 22	2845	71 0 52	2859	69 27 40	2873	67 54 46	2887
	Pollux E.	77 20 24	2704	75 43 49	2719	74 7 34	2732	72 31 37	2747
2	<i>α</i> Aquilæ W.	102 15 29	3337	103 38 58	3358	105 2 2	3379	106 24 42	3402
	Fomalhaut W.	77 8 18	3220	78 34 3	3229	79 59 38	3237	81 25 3	3247
	<i>α</i> Pegasi W.	55 31 57	2988	57 2 25	2994	58 32 45	3000	60 2 58	3007
	Mars E.	60 14 51	2958	58 43 45	2972	57 12 57	2985	55 42 26	2999
	Pollux E.	64 36 44	2821	63 2 43	2835	61 29 1	2850	59 55 38	2864
	Regulus E.	101 25 51	2786	99 51 5	2800	98 16 37	2813	96 42 26	2826
3	Fomalhaut W.	88 29 7	3301	89 53 17	3313	91 17 14	3325	92 40 57	3338
	<i>α</i> Pegasi W.	67 31 45	3046	69 1 1	3054	70 30 7	3063	71 59 2	3071
	Mars E.	48 13 58	3064	46 45 4	3076	45 16 25	3087	43 48 0	3100
	Pollux E.	52 13 22	2937	50 41 50	2952	49 10 37	2966	47 39 42	2981
	Regulus E.	88 55 38	2888	87 23 4	2900	85 50 45	2912	84 18 41	2923
4	Fomalhaut W.	99 35 50	3403	100 58 3	3416	102 20 1	3431	103 41 42	3446
	<i>α</i> Pegasi W.	79 21 4	3113	80 48 58	3121	82 16 42	3129	83 44 17	3136
	<i>α</i> Arietis W.	35 58 16	3017	37 28 8	3022	38 57 53	3028	40 27 31	3034
	Mars E.	36 29 25	3154	35 2 21	3163	33 35 28	3173	32 8 47	3182
	Pollux E.	40 9 41	3056	38 40 37	3071	37 11 52	3087	35 43 26	3104
	Regulus E.	76 41 48	2975	75 11 4	2985	73 40 32	2994	72 10 12	3002
	Sun E.	120 0 59	3355	118 37 51	3365	117 14 55	3374	115 52 9	3384
5	<i>α</i> Pegasi W.	90 59 59	3172	92 26 42	3178	93 53 18	3184	95 19 46	3189
	<i>α</i> Arietis W.	47 53 57	3060	49 22 55	3065	50 51 47	3069	52 20 34	3073
	Pollux E.	28 26 40	3201	27 0 32	3225	25 34 53	3233	24 9 47	3237
	Regulus E.	64 41 2	3041	63 11 40	3047	61 42 25	3053	60 13 18	3058
	Sun E.	109 0 43	3422	107 38 51	3428	106 17 6	3433	104 55 27	3439
6	<i>α</i> Arietis W.	59 43 28	3087	61 11 53	3088	62 40 17	3090	64 8 39	3091
	Aldebaran W.	27 51 46	3271	29 16 31	3256	30 41 34	3242	32 6 54	3229
	Regulus E.	52 49 14	3080	51 20 40	3083	49 52 10	3086	48 23 43	3087
	Sun E.	98 8 36	3459	96 47 26	3462	95 26 19	3463	94 5 14	3464
7	<i>α</i> Arietis W.	71 30 25	3088	72 58 49	3086	74 27 16	3083	75 55 46	3081
	Aldebaran W.	39 16 52	3180	40 43 25	3173	42 10 7	3164	43 36 59	3157
	Regulus E.	41 1 58	3093	39 33 40	3093	38 5 22	3093	36 37 4	3093
	Sun E.	87 20 0	3463	85 58 55	3463	84 37 49	3460	83 16 40	3458
8	<i>α</i> Arietis W.	83 19 18	3060	84 48 17	3051	86 17 23	3047	87 46 37	3042
	Aldebaran W.	50 53 42	3115	52 21 33	3103	53 49 33	3099	55 17 44	3091
	Regulus E.	29 15 23	3089	27 47 0	3088	26 18 36	3088	24 50 12	3089
	Sun E.	76 30 0	3436	75 8 24	3431	73 46 42	3424	72 24 53	3418
9	<i>α</i> Arietis W.	95 14 52	3004	96 45 0	2995	98 15 19	2986	99 45 49	2977
	Aldebaran W.	62 41 25	3043	64 10 45	3032	65 40 18	3022	67 10 4	3010
	Sun E.	65 33 46	3378	64 11 4	3369	62 48 12	3359	61 25 9	3350

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	Aldebaran W.	68 40 4	2999	70 10 18	2989	71 40 45	2977	73 11 27	2965
	Pollux W.	27 4 25	3121	28 32 9	3094	30 0 26	3069	31 29 13	3047
	MARS W.	26 30 46	3131	27 58 18	3119	29 26 4	3108	30 54 4	3096
	SUN E.	60 1 55	3339	58 38 29	3329	57 14 51	3318	55 51 0	3307
11	Aldebaran W.	80 48 43	2903	82 20 58	2890	83 53 30	2877	85 26 18	2864
	Pollux W.	38 59 44	2947	40 31 3	2929	42 2 45	2911	43 34 50	2894
	MARS W.	38 17 48	3032	39 47 21	3019	41 17 10	3005	42 47 16	2991
	SUN E.	48 48 28	3248	47 23 16	3236	45 57 49	3223	44 32 7	3211
12	Aldebaran W.	93 14 37	2797	94 49 9	2783	96 23 59	2769	97 59 7	2756
	Pollux W.	51 20 42	2810	52 54 57	2794	54 29 33	2778	56 4 30	2762
	MARS W.	50 22 12	2920	51 54 5	2905	53 26 17	2891	54 58 48	2876
	SUN E.	37 20 0	3151	35 52 52	3138	34 25 29	3127	32 57 52	3117
17	SUN W.	25 53 25	2699	27 30 6	2685	29 7 6	2672	30 44 23	2661
	$\alpha$ Aquilæ E.	75 13 21	2871	73 40 25	2876	72 7 36	2883	70 34 55	2891
	Fomalhaut E.	100 20 25	2740	98 44 38	2730	97 8 38	2722	95 32 27	2715
18	SUN W.	38 53 58	2623	40 32 22	2618	42 10 53	2612	43 49 31	2609
	$\alpha$ Aquilæ E.	62 55 2	2963	61 24 3	2985	59 53 32	3009	58 23 31	3037
	Fomalhaut E.	87 29 41	2695	85 52 55	2695	84 16 9	2696	82 39 24	2698
	$\alpha$ Pegasi E.	108 8 5	2425	106 25 6	2420	104 42 0	2415	102 58 47	2411
19	SUN W.	52 3 47	2596	53 42 47	2596	55 21 48	2594	57 0 51	2594
	Fomalhaut E.	74 36 42	2724	73 0 34	2732	71 24 37	2743	69 48 54	2755
	$\alpha$ Pegasi E.	94 21 32	2400	92 37 57	2400	90 54 22	2400	89 10 47	2400
20	SUN W.	65 16 3	2597	66 55 2	2599	68 33 59	2601	70 12 53	2602
	Antares W.	24 18 21	2274	26 4 59	2274	27 51 36	2276	29 38 11	2277
	Fomalhaut E.	61 54 54	2838	60 21 16	2862	58 48 8	2887	57 15 32	2914
	$\alpha$ Pegasi E.	80 33 17	2410	78 49 57	2415	77 6 43	2419	75 23 35	2423
21	SUN W.	78 26 40	2615	80 5 14	2618	81 43 44	2622	83 22 9	2625
	Antares W.	38 30 33	2287	40 16 52	2290	42 3 6	2293	43 49 16	2296
	SATURN W.	36 59 45	2343	38 44 42	2344	40 29 38	2345	42 14 32	2347
	VENUS W.	36 54 46	2485	38 36 20	2487	40 17 51	2489	41 59 20	2492
	Fomalhaut E.	49 42 31	3101	48 14 23	3151	46 47 15	3207	45 21 14	3268
	$\alpha$ Pegasi E.	66 49 47	2455	65 7 30	2463	63 25 25	2472	61 43 32	2482
22	SUN W.	91 32 59	2616	93 10 52	2649	94 48 40	2655	96 26 21	2659
	Antares W.	52 38 52	2314	54 24 31	2317	56 10 5	2322	57 55 33	2326
	SATURN W.	50 58 15	2359	52 42 48	2363	54 27 16	2366	56 11 39	2370
	VENUS W.	50 25 50	2505	52 6 56	2508	53 47 58	2512	55 28 55	2515
	$\alpha$ Pegasi E.	53 17 53	2543	51 37 39	2559	49 57 47	2576	48 18 19	2594
	$\alpha$ Arietis E.	95 12 34	2330	93 27 18	2333	91 42 7	2337	89 57 2	2342
23	SUN W.	104 33 11	2684	106 10 13	2689	107 47 7	2695	109 23 54	2701
	Antares W.	66 41 19	2348	68 26 8	2353	70 10 51	2357	71 55 27	2362
	SATURN W.	64 52 12	2390	66 36 1	2395	68 19 43	2399	70 3 19	2404
	VENUS W.	63 52 25	2534	65 32 51	2538	67 13 12	2542	68 53 27	2545
	$\alpha$ Arietis E.	81 13 16	2365	79 28 51	2371	77 44 34	2375	76 0 24	2380

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	Aldebaran W.	74 42 23	2954	76 13 34	2941	77 45 1	2928	79 16 44	2916
	Pollux W.	32 58 28	3025	34 28 10	3005	35 58 17	2985	37 28 48	2965
	MARS W.	32 22 18	3084	33 50 47	3071	35 19 32	3059	36 48 32	3046
	SUN E.	54 26 57	3295	53 2 40	3284	51 38 10	3272	50 13 26	3260
11	Aldebaran W.	86 59 23	2851	88 32 45	2837	90 6 25	2824	91 40 22	2810
	Pollux W.	45 7 17	2876	46 40 6	2860	48 13 16	2843	49 46 48	2826
	MARS W.	44 17 40	2977	45 48 21	2963	47 19 20	2949	48 50 37	2935
	SUN E.	43 6 11	3198	41 40 0	3186	40 13 34	3174	38 46 54	3163
12	Aldebaran W.	99 34 33	2742	101 10 17	2729	102 46 18	2716	104 22 37	2702
	Pollux W.	57 39 48	2746	59 15 27	2731	60 51 26	2715	62 27 46	2699
	MARS W.	56 31 37	2861	58 4 46	2847	59 38 13	2831	61 12 0	2818
	SUN E.	31 30 3	3106	30 2 1	3097	28 33 48	3089	27 5 25	3082
17	SUN W.	32 21 55	2652	33 59 40	2643	35 37 36	2636	37 15 42	2629
	α Aquilæ E.	69 2 25	2901	67 30 8	2914	65 58 7	2928	64 26 24	2945
	Fomalhaut E.	93 56 7	2709	92 19 39	2704	90 43 4	2700	89 6 24	2698
18	SUN W.	45 28 14	2605	47 7 2	2602	48 45 54	2600	50 24 49	2598
	α Aquilæ E.	56 54 4	3068	55 25 15	3101	53 57 7	3139	52 29 45	3184
	Fomalhaut E.	81 2 41	2701	79 26 2	2704	77 49 28	2710	76 13 1	2716
	α Pegasi E.	101 15 28	2408	99 32 4	2405	97 48 36	2403	96 5 5	2401
19	SUN W.	58 39 54	2594	60 18 57	2594	61 58 0	2595	63 37 2	2596
	Fomalhaut E.	68 13 27	2768	66 38 17	2783	65 3 27	2799	63 28 58	2818
	α Pegasi E.	87 27 12	2401	85 43 39	2403	84 0 8	2405	82 16 41	2408
20	SUN W.	71 51 45	2604	73 30 34	2607	75 9 19	2610	76 48 1	2612
	Antares W.	31 24 45	2279	33 11 16	2280	34 57 45	2282	36 44 11	2285
	Fomalhaut E.	55 43 31	2945	54 12 9	2978	52 41 29	3013	51 11 35	3056
	α Pegasi E.	73 40 33	2428	71 57 38	2434	70 14 52	2441	68 32 15	2447
21	SUN W.	85 0 30	2629	86 38 45	2633	88 16 55	2637	89 55 0	2641
	Antares W.	45 35 21	2299	47 21 22	2303	49 7 17	2307	50 53 7	2310
	SATURN W.	43 59 23	2349	45 44 11	2351	47 28 56	2353	49 13 38	2357
	VENUS W.	43 40 45	2494	45 22 7	2497	47 3 25	2499	48 44 40	2502
	Fomalhaut E.	43 56 25	3337	42 32 56	3415	41 10 56	3500	39 50 32	3597
	α Pegasi E.	60 1 53	2492	58 20 28	2503	56 39 19	2515	54 58 27	2528
22	SUN W.	98 3 56	2663	99 41 25	2669	101 18 47	2674	102 56 2	2678
	Antares W.	59 40 55	2330	61 26 11	2335	63 11 20	2339	64 56 23	2344
	SATURN W.	57 55 57	2374	59 40 9	2378	61 24 16	2382	63 8 17	2386
	VENUS W.	57 9 47	2519	58 50 34	2522	60 31 16	2526	62 11 53	2530
	α Pegasi E.	46 39 16	2615	45 0 42	2638	43 22 38	2663	41 45 8	2689
	α Arietis E.	88 12 4	2346	86 27 12	2351	84 42 27	2355	82 57 48	2360
23	SUN W.	111 0 33	2706	112 37 5	2712	114 13 29	2718	115 49 45	2724
	Antares W.	73 39 56	2367	75 24 18	2372	77 8 33	2378	78 52 40	2383
	SATURN W.	71 46 48	2409	73 30 10	2414	75 13 25	2419	76 56 33	2424
	VENUS W.	70 33 37	2550	72 13 41	2555	73 53 38	2559	75 33 29	2564
	α Arietis E.	74 16 21	2386	72 32 26	2391	70 48 39	2397	69 5 0	2403

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	III <sup>h</sup> .	P. L. of Diff.	VI <sup>h</sup> .	P. L. of Diff.	IX <sup>h</sup> .	P. L. of Diff.
24	SUN W.	117 25 53	2730	119 1 53	2737	120 37 44	2744	122 13 26	2750
	Antares W.	80 36 39	2389	82 20 30	2394	84 4 14	2399	85 47 50	2405
	SATURN W.	78 39 33	2429	80 22 26	2435	82 5 11	2440	83 47 49	2446
	VENUS W.	77 13 14	2569	78 52 52	2573	80 32 24	2578	82 11 49	2583
	α Arietis E.	67 21 29	2409	65 38 7	2415	63 54 53	2421	62 11 48	2426
	Aldebaran E.	100 4 1	2433	98 21 13	2437	96 38 31	2443	94 55 57	2448
25	Antares W.	94 23 45	2435	96 6 30	2441	97 49 6	2448	99 31 33	2454
	SATURN W.	92 18 53	2476	94 0 40	2482	95 42 18	2489	97 23 47	2496
	VENUS W.	90 27 10	2610	92 5 52	2615	93 44 26	2621	95 22 53	2627
	α Aquilæ W.	46 54 37	3516	48 14 43	3466	49 35 45	3421	50 57 38	3381
	α Arietis E.	53 38 48	2463	51 56 43	2470	50 14 48	2479	48 33 5	2487
	Aldebaran E.	86 25 5	2477	84 43 20	2485	83 1 45	2491	81 20 19	2498
26	VENUS W.	103 33 0	2658	105 10 36	2666	106 48 2	2672	108 25 19	2680
	α Aquilæ W.	57 56 53	3241	59 22 14	3222	60 47 57	3205	62 14 0	3192
	α Arietis E.	40 7 36	2535	38 27 12	2546	36 47 3	2558	35 7 10	2570
	Aldebaran E.	72 55 41	2536	71 15 18	2545	69 35 7	2553	67 55 7	2562
27	α Aquilæ W.	69 27 36	3150	70 54 45	3146	72 21 59	3144	73 49 15	3143
	Fomalhaut W.	44 51 12	3490	46 11 47	3447	47 33 10	3409	48 55 16	3377
	Aldebaran E.	59 38 20	2610	57 59 39	2621	56 21 13	2632	54 43 2	2643
	Pollux E.	101 29 59	2589	99 50 49	2597	98 11 50	2606	96 33 3	2614
	MARS E.	108 50 18	2688	107 13 22	2697	105 36 38	2706	104 0 6	2714
28	α Aquilæ W.	81 5 27	3155	82 32 30	3161	83 59 26	3167	85 26 15	3174
	Fomalhaut W.	55 53 42	3266	57 18 33	3253	58 43 40	3241	60 9 1	3231
	α Pegasi W.	33 19 0	3115	34 46 51	3086	36 15 18	3061	37 44 15	3040
	Aldebaran E.	46 36 10	2708	44 59 41	2723	43 23 32	2738	41 47 43	2754
	Pollux E.	88 22 4	2660	86 44 30	2669	85 7 9	2679	83 30 1	2689
	MARS E.	96 0 21	2760	94 25 1	2769	92 49 53	2780	91 14 59	2789
29	α Aquilæ W.	92 37 48	3223	94 3 30	3236	95 28 57	3248	96 54 9	3263
	Fomalhaut W.	67 17 52	3209	68 43 51	3208	70 9 51	3208	71 35 51	3210
	α Pegasi W.	45 13 56	2985	46 44 27	2981	48 15 3	2978	49 45 43	2977
	Pollux E.	75 27 48	2742	73 52 4	2753	72 16 34	2764	70 41 19	2775
	MARS E.	83 23 43	2841	81 50 8	2851	80 16 46	2862	78 43 38	2873
	Regulus E.	112 21 6	2714	110 44 45	2725	109 8 37	2734	107 32 42	2744
30	α Aquilæ W.	103 55 43	3345	105 19 3	3364	106 42 1	3384	108 4 36	3405
	Fomalhaut W.	78 44 59	3231	80 10 32	3236	81 35 58	3243	83 1 16	3252
	α Pegasi W.	57 19 3	2985	58 49 35	2989	60 20 2	2993	61 50 24	2998
	Pollux E.	62 48 50	2834	61 15 6	2846	59 41 38	2859	58 8 26	2870
	MARS E.	71 1 24	2926	69 29 38	2937	67 58 6	2948	66 26 48	2958
	Regulus E.	99 36 33	2796	98 2 0	2807	96 27 41	2817	94 53 35	2828
31	Fomalhaut W.	90 5 15	3298	91 29 29	3309	92 53 30	3320	94 17 18	3332
	α Pegasi W.	69 20 27	3029	70 50 4	3036	72 19 32	3043	73 48 51	3051
	α Arietis W.	25 45 26	2965	27 16 22	2966	28 47 17	2968	30 18 10	2970
	Pollux E.	50 26 25	2935	48 54 50	2948	47 23 32	2962	45 52 31	2976
	MARS E.	58 53 39	3013	57 23 42	3022	55 53 57	3033	54 24 25	3043
	Regulus E.	87 6 29	2880	85 33 44	2889	84 1 11	2900	82 28 52	2909

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LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
24	SUN	W.	123 48 59	2757	125 24 23	2765	126 59 37	2772	128 34 42	2779
	Antares	W.	87 31 18	2410	89 14 38	2417	90 57 49	2423	92 40 51	2429
	SATURN	W.	85 30 18	2452	87 12 39	2458	88 54 52	2463	90 36 57	2470
	VENUS	W.	83 51 8	2588	85 30 20	2593	87 9 24	2599	88 48 21	2604
	α Arietis	E.	60 28 53	2434	58 46 7	2441	57 3 30	2448	55 21 4	2453
	Aldebaran	E.	93 13 30	2453	91 31 11	2460	89 49 1	2465	88 6 59	2471
25	Antares	W.	101 13 51	2461	102 55 59	2467	104 37 58	2473	106 19 47	2482
	SATURN	W.	99 5 6	2502	100 46 16	2510	102 27 16	2517	104 8 6	2524
	VENUS	W.	97 1 11	2633	98 39 21	2639	100 17 23	2646	101 55 16	2652
	α Aquilæ	W.	52 20 16	3345	53 43 35	3344	55 7 30	3387	56 31 57	3382
	α Arietis	E.	46 51 34	2496	45 10 15	2504	43 29 8	2515	41 48 15	2525
	Aldebaran	E.	79 39 3	2505	77 57 57	2512	76 17 1	2520	74 36 15	2528
26	VENUS	W.	110 2 26	2687	111 39 24	2694	113 16 12	2701	114 52 50	2709
	α Aquilæ	W.	63 40 19	3180	65 6 52	3169	66 33 38	3162	68 0 33	3155
	α Arietis	E.	33 27 34	2583	31 48 16	2598	30 9 18	2614	28 30 42	2633
	Aldebaran	E.	66 15 20	2571	64 35 45	2580	62 56 23	2591	61 17 15	2600
27	α Aquilæ	W.	75 16 33	3143	76 43 50	3144	78 11 6	3147	79 38 19	3151
	Fomalhaut	W.	50 17 59	3348	51 41 15	3323	53 5 0	3301	54 29 10	3282
	Aldebaran	E.	53 5 6	2655	51 27 26	2668	49 50 3	2681	48 12 57	2695
	Pollux	E.	94 54 27	2623	93 16 3	2632	91 37 51	2640	89 59 51	2650
	MARS	E.	102 23 45	2723	100 47 36	2732	99 11 39	2741	97 35 54	2750
28	α Aquilæ	W.	86 52 55	3183	88 19 25	3191	89 45 45	3201	91 11 53	3212
	Fomalhaut	W.	61 34 33	3224	63 0 14	3212	64 26 2	3214	65 51 55	3210
	α Pegasi	W.	39 13 38	3024	40 43 21	3011	42 13 20	3000	43 43 33	2992
	Aldebaran	E.	40 12 15	2772	38 37 10	2789	37 2 28	2809	35 28 12	2830
	Pollux	E.	81 53 7	2699	80 16 26	2710	78 39 59	2720	77 3 46	2732
	MARS	E.	89 40 17	2799	88 5 48	2810	86 31 33	2820	84 57 31	2831
29	α Aquilæ	W.	98 19 4	3277	99 43 42	3293	101 8 2	3309	102 32 3	3327
	Fomalhaut	W.	73 1 48	3213	74 27 42	3215	75 53 33	3220	77 19 19	3225
	α Pegasi	W.	51 16 25	2977	52 47 7	2977	54 17 48	2979	55 48 27	2981
	Pollux	E.	69 6 19	2787	67 31 34	2798	65 57 4	2810	64 22 49	2822
	MARS	E.	77 10 44	2883	75 38 4	2894	74 5 37	2905	72 33 24	2915
	Regulus	E.	105 57 1	2755	104 21 34	2765	102 46 20	2775	101 11 20	2785
30	α Aquilæ	W.	109 26 47	3427	110 48 33	3440	112 9 54	3473	113 30 48	3498
	Fomalhaut	W.	84 26 24	3259	85 51 23	3269	87 16 11	3277	88 40 49	3288
	α Pegasi	W.	63 20 39	3004	64 50 47	3009	66 20 48	3016	67 50 41	3022
	Pollux	E.	56 35 29	2883	55 2 48	2896	53 30 24	2909	51 58 16	2922
	MARS	E.	64 55 43	2969	63 24 52	2980	61 54 14	2991	60 23 50	3001
	Regulus	E.	93 19 43	2838	91 46 4	2848	90 12 39	2859	88 39 27	2869
31	Fomalhaut	W.	95 40 53	3344	97 4 14	3357	98 27 20	3369	99 50 12	3383
	α Pegasi	W.	75 18 1	3058	76 47 2	3066	78 15 53	3073	79 44 35	3082
	α Arietis	W.	31 49 0	2674	33 19 45	2678	34 50 25	2683	36 20 59	2689
	Pollux	E.	44 21 48	2689	42 51 22	2695	41 21 15	2699	39 51 26	2694
	MARS	E.	52 55 6	3054	51 26 0	3064	49 57 6	3074	48 28 25	3084
	Regulus	E.	80 56 45	2920	79 24 51	2929	77 53 9	2939	76 21 39	2948

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S					Sidereal Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from Apparent Time.	Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>'</sup> <sup>"</sup>	<sup>s</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>
Tues.	1	14 26 49.09	9.803	S. 14 32 11.4	-47.92	16 9.86	66.98	16 18.98	0.053
Wed.	2	14 30 44.77	9.837	14 51 14.6	47.33	16 10.10	67.09	16 19.85	0.019
Thur.	3	14 34 41.28	9.872	15 10 3.3	46.72	16 10.34	67.20	16 19.91	0.015
Frid.	4	14 38 38.61	9.907	15 28 37.3	-46.10	16 10.58	67.32	16 19.12	0.050
Sat.	5	14 42 36.80	9.942	15 46 56.0	45.46	16 10.82	67.43	16 17.49	0.085
SUN.	6	14 46 35.83	9.978	16 4 59.1	44.80	16 11.05	67.55	16 15.02	0.121
Mon.	7	14 50 35.73	10.014	16 22 46.2	-44.12	16 11.28	67.67	16 11.69	0.157
Tues.	8	14 54 36.49	10.050	16 40 16.8	43.42	16 11.50	67.79	16 7.50	0.193
Wed.	9	14 58 38.11	10.086	16 57 30.5	42.71	16 11.73	67.91	16 2.45	0.229
Thur.	10	15 2 40.60	10.122	17 14 26.9	-41.98	16 11.95	68.03	15 56.54	0.265
Frid.	11	15 6 43.95	10.158	17 31 5.6	41.23	16 12.17	68.15	15 49.75	0.301
Sat.	12	15 10 48.17	10.194	17 47 26.1	40.47	16 12.39	68.27	15 42.11	0.337
SUN.	13	15 14 53.25	10.229	18 3 28.1	-39.69	16 12.61	68.39	15 33.62	0.372
Mon.	14	15 18 59.18	10.265	18 19 11.2	38.89	16 12.82	68.51	15 24.26	0.407
Tues.	15	15 23 5.95	10.300	18 34 34.9	38.07	16 13.03	68.63	15 14.07	0.442
Wed.	16	15 27 13.57	10.335	18 49 38.8	-37.24	16 13.24	68.74	15 3.04	0.477
Thur.	17	15 31 22.01	10.369	19 4 22.5	36.39	16 13.45	68.86	14 51.19	0.511
Frid.	18	15 35 31.28	10.403	19 18 45.8	35.53	16 13.66	68.98	14 38.51	0.545
Sat.	19	15 39 41.36	10.437	19 32 48.0	-34.65	16 13.87	69.09	14 25.03	0.579
SUN.	20	15 43 52.24	10.470	19 46 29.1	33.76	16 14.07	69.20	14 10.74	0.612
Mon.	21	15 48 3.90	10.502	19 59 48.4	32.85	16 14.27	69.31	13 55.68	0.644
Tues.	22	15 52 16.35	10.535	20 12 45.8	-31.93	16 14.46	69.42	13 39.83	0.676
Wed.	23	15 56 29.57	10.567	20 25 20.9	30.99	16 14.65	69.53	13 23.21	0.708
Thur.	24	16 0 43.56	10.598	20 37 33.3	30.04	16 14.83	69.63	13 5.83	0.739
Frid.	25	16 4 58.29	10.629	20 49 22.6	-29.07	16 15.01	69.73	12 47.71	0.770
Sat.	26	16 9 13.75	10.660	21 0 48.6	28.09	16 15.19	69.83	12 28.86	0.801
SUN.	27	16 13 29.94	10.690	21 11 51.0	27.10	16 15.36	69.93	12 9.27	0.831
Mon.	28	16 17 46.84	10.719	21 22 29.4	-26.09	16 15.53	70.03	11 48.98	0.860
Tues.	29	16 22 4.45	10.748	21 32 43.6	25.07	16 15.69	70.12	11 27.99	0.889
Wed.	30	16 26 22.73	10.776	21 42 33.1	24.05	16 15.84	70.21	11 6.33	0.917
Thur.	31	16 30 41.68	10.803	S. 21 51 57.8	-23.01	16 15.99	70.30	10 44.00	0.943

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sidereal time.

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to Mean Time.	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
		<sup>h</sup> <sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>°</sup> <sup>'</sup> <sup>"</sup>	<sup>"</sup>	<sup>m</sup> <sup>s</sup>	<sup>s</sup>	<sup>h</sup> <sup>m</sup> <sup>s</sup>
Tues.	1	14 26 51.76	9.804	S. 14 32 24.4	-47.92	16 18.99	0.053	14 43 10.75
Wed.	2	14 30 47.45	9.838	14 51 27.4	47.33	16 19.85	0.019	14 47 7.30
Thur.	3	14 34 43.96	9.872	15 10 16.0	46.72	16 19.90	0.015	14 51 3.86
Frid.	4	14 38 41.31	9.907	15 28 49.8	-46.09	16 19.10	0.050	14 55 0.41
Sat.	5	14 42 39.50	9.942	15 47 8.3	45.45	16 17.47	0.085	14 58 56.97
SUN.	6	14 46 38.53	9.978	16 5 11.2	44.79	16 14.99	0.121	15 2 53.52
Mon.	7	14 50 38.43	10.014	16 22 58.1	-44.11	16 11.65	0.157	15 6 50.08
Tues.	8	14 54 39.19	10.049	16 40 28.4	43.41	16 7.45	0.193	15 10 46.64
Wed.	9	14 58 40.80	10.085	16 57 41.9	42.70	16 2.39	0.229	15 14 43.19
Thur.	10	15 2 43.28	10.121	17 14 38.0	-41.97	15 56.47	0.265	15 18 39.75
Frid.	11	15 6 46.63	10.157	17 31 16.4	41.22	15 49.67	0.301	15 22 36.30
Sat.	12	15 10 50.84	10.193	17 47 36.7	40.46	15 42.02	0.337	15 26 32.86
SUN.	13	15 14 55.90	10.229	18 3 38.4	-39.68	15 33.52	0.372	15 30 29.42
Mon.	14	15 19 1.81	10.264	18 19 21.1	38.88	15 24.16	0.407	15 34 25.97
Tues.	15	15 23 8.57	10.299	18 34 44.5	38.06	15 13.96	0.442	15 38 22.53
Wed.	16	15 27 16.16	10.334	18 49 48.1	-37.23	15 2.92	0.477	15 42 19.08
Thur.	17	15 31 24.58	10.368	19 4 31.5	36.38	14 51.06	0.511	15 46 15.64
Frid.	18	15 35 33.82	10.402	19 18 54.4	35.52	14 38.38	0.545	15 50 12.20
Sat.	19	15 39 43.86	10.435	19 32 56.3	-34.64	14 24.89	0.579	15 54 8.75
SUN.	20	15 43 54.71	10.468	19 46 37.0	33.74	14 10.60	0.612	15 58 5.31
Mon.	21	15 48 6.34	10.501	19 59 56.0	32.83	13 55.53	0.644	16 2 1.87
Tues.	22	15 52 18.75	10.533	20 12 53.1	-31.91	13 39.67	0.676	16 5 58.42
Wed.	23	15 56 31.93	10.565	20 25 27.8	30.97	13 23.05	0.708	16 9 54.98
Thur.	24	16 0 45.87	10.596	20 37 39.8	30.02	13 5.67	0.739	16 13 51.54
Frid.	25	16 5 0.55	10.627	20 49 28.8	-29.06	12 47.55	0.770	16 17 48.10
Sat.	26	16 9 15.96	10.657	21 0 54.5	28.08	12 28.69	0.801	16 21 44.65
SUN.	27	16 13 32.11	10.687	21 11 56.5	27.09	12 9.10	0.831	16 25 41.21
Mon.	28	16 17 48.96	10.716	21 22 34.5	-26.08	11 48.81	0.860	16 29 37.77
Tues.	29	16 22 6.50	10.745	21 32 48.3	25.06	11 27.82	0.889	16 33 34.32
Wed.	30	16 26 24.72	10.773	21 42 37.5	24.03	11 6.16	0.917	16 37 30.88
Thur.	31	16 30 43.61	10.801	S. 21 52 1.9	-22.99	10 43.83	0.943	16 41 27.44

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
The sign — prefixed to the hourly change of declination indicates that south declinations are increasing.

Diff. for 1 Hour,  
+ 9° 85' 65.  
(Table III.)

AT GREENWICH MEAN NOON.									
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.	
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.				
		$\lambda$	$\lambda'$						
1	305	219 6 56.0	5 58.4	150.19	+ 0.33	9.9964666	-45.7	h m s 9 15 18.03	
2	306	220 7 1.6	6 3.9	150.27	0.21	9.9963577	45.1	9 11 22.12	
3	307	221 7 9.3	6 11.4	150.35	+ 0.09	9.9962502	44.5	9 7 26.21	
4	308	222 7 18.9	6 20.9	150.44	- 0.04	9.9961440	-43.9	9 3 30.30	
5	309	223 7 30.7	6 32.5	150.53	0.17	9.9960392	43.4	8 59 34.39	
6	310	224 7 44.5	6 46.2	150.62	0.28	9.9959356	42.9	8 55 38.48	
7	311	225 8 0.6	7 2.2	150.71	- 0.37	9.9958334	-42.4	8 51 42.57	
8	312	226 8 18.4	7 19.8	150.79	0.44	9.9957321	42.0	8 47 46.66	
9	313	227 8 38.3	7 39.6	150.87	0.48	9.9956318	41.6	8 43 50.75	
10	314	228 9 0.1	8 1.2	150.95	- 0.50	9.9955325	-41.2	8 39 54.84	
11	315	229 9 23.9	8 24.9	151.03	0.47	9.9954339	40.9	8 35 58.93	
12	316	230 9 49.4	8 50.2	151.10	0.42	9.9953361	40.6	8 32 3.02	
13	317	231 10 16.7	9 17.4	151.17	- 0.35	9.9952393	-40.3	8 28 7.11	
14	318	232 10 45.6	9 46.1	151.24	0.25	9.9951432	40.0	8 24 11.20	
15	319	233 11 16.1	10 16.5	151.30	- 0.14	9.9950477	39.6	8 20 15.29	
16	320	234 11 48.0	10 48.2	151.36	0.00	9.9949533	-39.2	8 16 19.38	
17	321	235 12 21.3	11 21.3	151.42	+ 0.13	9.9948600	38.7	8 12 23.47	
18	322	236 12 55.9	11 55.8	151.47	0.27	9.9947677	38.2	8 8 27.56	
19	323	237 13 31.8	12 31.5	151.52	+ 0.40	9.9946765	-37.7	8 4 31.65	
20	324	238 14 8.9	13 8.5	151.57	0.51	9.9945868	37.1	8 0 35.74	
21	325	239 14 47.1	13 46.5	151.62	0.60	9.9944988	36.4	7 56 39.83	
22	326	240 15 26.4	14 25.6	151.67	+ 0.66	9.9944123	-35.7	7 52 43.92	
23	327	241 16 6.8	15 5.9	151.72	0.70	9.9943276	34.9	7 48 48.01	
24	328	242 16 48.4	15 47.3	151.76	0.70	9.9942448	34.0	7 44 52.10	
25	329	243 17 31.1	16 29.9	151.80	+ 0.68	9.9941644	-33.1	7 40 56.18	
26	330	244 18 14.9	17 13.5	151.85	0.62	9.9940861	32.2	7 37 0.27	
27	331	245 18 59.8	17 58.2	151.90	0.55	9.9940100	31.2	7 33 4.36	
28	332	246 19 45.9	18 44.1	151.95	+ 0.44	9.9939364	-30.2	7 29 8.45	
29	333	247 20 33.2	19 31.3	152.00	0.33	9.9938652	29.2	7 25 12.54	
30	334	248 21 21.7	20 19.6	152.05	0.20	9.9937965	28.2	7 21 16.63	
31	335	249 22 11.5	21 9.2	152.10	+ 0.07	9.9937301	-27.2	7 17 20.72	
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 Hour, —9 <sup>h</sup> .8296. (Table II.)	



GREENWICH MEAN TIME.									
Day of the Month.	THE MOON'S								
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.
	Noon.	Midnight.	Noon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Noon.
	h m	h m	h m	"	h m	"	h m	m	d
1	14 58.6	14 55.5	54 51.3	-1.00	54 39.9	-0.88	14 34.4	2.13	17.0
2	14 52.9	14 50.7	54 30.1	0.74	54 22.2	0.98	15 24.8	2.07	18.0
3	14 49.1	14 48.0	54 16.2	0.40	54 12.4	-0.22	16 13.5	1.98	19.0
4	14 47.6	14 47.9	54 10.9	-0.02	54 11.9	+0.19	17 0.0	1.90	20.0
5	14 48.9	14 50.5	54 15.4	+0.40	54 21.5	0.62	17 44.7	1.83	21.0
6	14 52.9	14 56.0	54 30.2	0.84	54 41.5	1.05	18 27.9	1.78	22.0
7	14 59.7	15 4.2	54 55.3	+1.26	55 11.6	+1.45	19 10.5	1.77	23.0
8	15 9.2	15 14.8	55 30.1	1.62	55 50.6	1.78	19 53.4	1.81	24.0
9	15 20.9	15 27.3	56 12.9	1.91	56 36.5	2.01	20 37.6	1.89	25.0
10	15 34.0	15 40.9	57 1.2	+2.08	57 26.4	+2.10	21 24.4	2.02	26.0
11	15 47.8	15 54.5	57 51.7	2.09	58 16.6	2.03	22 14.8	2.19	27.0
12	16 1.0	16 7.0	58 40.3	1.91	59 2.5	1.76	23 9.5	2.38	28.0
13	16 12.5	16 17.2	59 22.6	+1.56	59 40.0	+1.33	0		29.0
14	16 21.2	16 24.2	59 54.5	1.06	60 5.6	0.78	0 8.7	2.55	0.5
15	16 26.3	16 27.4	60 13.1	+0.48	60 17.2	+0.19	1 11.2	2.64	1.5
16	16 27.5	16 26.7	60 17.6	-0.10	60 14.7	-0.37	2 14.7	2.63	2.5
17	16 25.1	16 22.7	60 8.7	0.61	60 0.0	0.83	3 16.6	2.51	3.5
18	16 19.6	16 16.1	59 48.8	1.01	59 35.8	1.15	4 15.0	2.35	4.5
19	16 12.1	16 7.8	59 21.1	-1.27	59 5.3	-1.35	5 9.2	2.18	5.5
20	16 3.3	15 58.6	58 48.7	1.40	58 31.7	1.43	5 59.8	2.04	6.5
21	15 53.9	15 49.2	58 14.4	1.44	57 57.1	1.43	6 47.7	1.96	7.5
22	15 44.6	15 40.0	57 40.0	-1.41	57 23.2	-1.38	7 34.2	1.92	8.5
23	15 35.5	15 31.2	57 6.8	1.35	56 50.8	1.31	8 20.3	1.93	9.5
24	15 27.0	15 22.8	56 35.3	1.28	56 20.2	1.23	9 7.0	1.97	10.5
25	15 18.9	15 15.1	56 5.7	-1.19	55 51.6	-1.15	9 55.1	2.03	11.5
26	15 11.4	15 7.8	55 38.0	1.10	55 25.0	1.06	10 44.6	2.10	12.5
27	15 4.4	15 1.2	55 12.6	1.01	55 0.8	0.95	11 35.5	2.14	13.5
28	14 58.2	14 55.4	54 49.7	-0.88	54 39.5	-0.81	12 26.9	2.14	14.5
29	14 52.9	14 50.7	54 30.3	0.72	54 22.2	0.63	13 17.7	2.10	15.5
30	14 48.8	14 47.4	54 15.3	0.51	54 9.9	0.39	14 7.2	2.02	16.5
31	14 46.3	14 45.7	54 5.9	-0.25	54 3.8	-0.10	14 54.6	1.93	17.5

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 1.					THURSDAY 3.				
0	h m s	s	N. 24 43 5.6	1.368	0	h m s	s	N. 23 28 37.3	4.328
1	4 47 32.20	2.2335	24 44 23.9	1.242	1	6 32 55.84	2.1371	23 24 14.4	4.436
2	4 49 46.31	2.2347	24 45 34.7	1.117	2	6 35 3.97	2.1339	23 24 14.4	4.436
3	4 52 0.37	2.2339	24 46 38.0	0.992	3	6 37 11.91	2.1308	23 19 45.0	4.543
4	4 54 14.38	2.2330	24 47 33.8	0.867	4	6 39 19.67	2.1277	23 15 9.2	4.649
5	4 56 28.33	2.2320	24 48 22.1	0.742	5	6 41 27.24	2.1246	23 10 27.1	4.755
6	4 58 42.22	2.2310	24 49 2.9	0.617	6	6 43 34.62	2.1214	23 5 38.6	4.861
7	5 0 56.05	2.2300	24 49 36.2	0.492	7	6 45 41.81	2.1183	23 0 43.8	4.966
8	5 3 9.82	2.2288	24 50 2.0	0.368	8	6 47 48.81	2.1151	22 55 42.7	5.070
9	5 5 23.51	2.2276	24 50 20.4	0.244	9	6 49 55.62	2.1118	22 50 35.4	5.173
10	5 7 37.13	2.2264	24 50 31.3	+ 0.120	10	6 52 2.23	2.1086	22 45 21.9	5.277
11	5 9 50.68	2.2251	24 50 34.8	- 0.004	11	6 54 8.65	2.1054	22 40 2.2	5.379
12	5 12 4.14	2.2236	24 50 30.8	0.128	12	6 56 14.88	2.1022	22 34 36.4	5.481
13	5 14 17.51	2.2222	24 50 19.4	0.251	13	6 58 20.91	2.0988	22 29 4.5	5.582
14	5 16 30.80	2.2207	24 50 0.7	0.373	14	7 0 26.74	2.0956	22 23 26.6	5.682
15	5 18 44.00	2.2192	24 49 34.6	0.497	15	7 2 32.38	2.0923	22 17 42.6	5.782
16	5 20 57.10	2.2175	24 49 1.1	0.619	16	7 4 37.82	2.0890	22 11 52.7	5.882
17	5 23 10.10	2.2158	24 48 20.3	0.742	17	7 6 43.06	2.0857	22 5 56.8	5.981
18	5 25 23.00	2.2142	24 47 32.1	0.863	18	7 8 48.11	2.0824	21 59 55.0	6.078
19	5 27 35.80	2.2124	24 46 36.7	0.985	19	7 10 52.95	2.0791	21 53 47.4	6.176
20	5 29 48.49	2.2105	24 45 33.9	1.107	20	7 12 57.60	2.0758	21 47 33.9	6.273
21	5 32 1.06	2.2086	24 44 23.9	1.227	21	7 15 2.05	2.0725	21 41 14.6	6.369
22	5 34 13.52	2.2066	24 43 6.7	1.347	22	7 17 6.30	2.0692	21 34 49.6	6.465
23	5 36 25.85	2.2046	N. 24 41 42.2	1.468	23	7 19 10.35	2.0658	21 28 18.8	6.560
24	5 38 38.07	2.2026			24	7 21 14.20	2.0626	N. 21 21 42.4	6.654
WEDNESDAY 2.					FRIDAY 4.				
0	5 40 50.16	2.2005	N. 24 40 10.5	1.588	0	7 23 17.86	2.0593	N. 21 15 0.3	6.748
1	5 43 2.13	2.1983	24 38 31.7	1.707	1	7 25 21.31	2.0559	21 8 12.6	6.841
2	5 45 13.96	2.1961	24 36 45.7	1.826	2	7 27 24.57	2.0527	21 1 19.4	6.933
3	5 47 25.66	2.1939	24 34 52.6	1.945	3	7 29 27.63	2.0493	20 54 20.7	7.025
4	5 49 37.23	2.1916	24 32 52.3	2.063	4	7 31 30.49	2.0460	20 47 16.4	7.117
5	5 51 48.65	2.1892	24 30 45.0	2.181	5	7 33 33.15	2.0427	20 40 6.7	7.207
6	5 53 59.93	2.1868	24 28 30.6	2.298	6	7 35 35.62	2.0395	20 32 51.6	7.297
7	5 56 11.07	2.1844	24 26 9.2	2.415	7	7 37 37.89	2.0362	20 25 31.1	7.386
8	5 58 22.06	2.1819	24 23 40.8	2.532	8	7 39 39.97	2.0330	20 18 5.3	7.474
9	6 0 32.90	2.1793	24 21 5.4	2.648	9	7 41 41.85	2.0298	20 10 34.2	7.562
10	6 2 43.58	2.1768	24 18 23.1	2.763	10	7 43 43.54	2.0266	20 2 57.9	7.649
11	6 4 54.11	2.1742	24 15 33.9	2.878	11	7 45 45.04	2.0233	19 55 16.3	7.737
12	6 7 4.48	2.1715	24 12 37.7	2.993	12	7 47 46.34	2.0201	19 47 29.5	7.823
13	6 9 14.69	2.1688	24 9 34.7	3.107	13	7 49 47.45	2.0169	19 39 37.6	7.908
14	6 11 24.74	2.1661	24 6 24.8	3.221	14	7 51 48.37	2.0138	19 31 40.6	7.993
15	6 13 34.62	2.1633	24 3 8.2	3.333	15	7 53 49.11	2.0107	19 23 38.5	8.077
16	6 15 44.34	2.1606	23 59 44.8	3.447	16	7 55 49.65	2.0075	19 15 31.4	8.160
17	6 17 53.89	2.1577	23 56 14.6	3.559	17	7 57 50.01	2.0044	19 7 19.3	8.243
18	6 20 3.27	2.1548	23 52 37.7	3.670	18	7 59 50.18	2.0013	18 59 2.2	8.325
19	6 22 12.47	2.1519	23 48 54.2	3.781	19	8 1 50.17	1.9982	18 50 40.3	8.406
20	6 24 21.50	2.1490	23 45 4.0	3.892	20	8 3 49.97	1.9951	18 42 13.5	8.487
21	6 26 30.35	2.1461	23 41 7.2	4.002	21	8 5 49.60	1.9922	18 33 41.8	8.568
22	6 28 39.03	2.1431	23 37 3.8	4.112	22	8 7 49.04	1.9892	18 25 5.3	8.647
23	6 30 47.52	2.1401	23 32 53.8	4.221	23	8 9 48.31	1.9863	18 16 24.1	8.726
24	6 32 55.84	2.1371	N. 23 28 37.3	4.329	24	8 11 47.40	1.9834	N. 18 7 38.2	8.804

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 5.					MONDAY 7.				
0	8 11 47.40	1.9834	N. 18 7 38.2	8.804	0	9 44 19.51	1.8898	N. 9 46 35.0	11.836
1	8 13 46.32	1.9805	17 58 47.6	8.882	1	9 46 12.88	1.8891	9 34 43.4	11.884
2	8 15 45.06	1.9776	17 49 52.3	8.960	2	9 48 6.20	1.8884	9 22 48.9	11.932
3	8 17 43.63	1.9747	17 40 52.4	9.036	3	9 49 59.49	1.8878	9 10 51.6	11.978
4	8 19 42.03	1.9719	17 31 48.0	9.112	4	9 51 52.74	1.8872	8 58 51.5	12.025
5	8 21 40.26	1.9692	17 22 39.0	9.187	5	9 53 45.96	1.8867	8 46 48.6	12.071
6	8 23 38.33	1.9665	17 13 25.6	9.261	6	9 55 39.15	1.8863	8 34 43.0	12.116
7	8 25 36.24	1.9637	17 4 7.7	9.336	7	9 57 32.32	1.8860	8 22 34.7	12.160
8	8 27 33.98	1.9610	16 54 45.3	9.409	8	9 59 25.47	1.8857	8 10 23.8	12.203
9	8 29 31.56	1.9583	16 45 18.6	9.482	9	10 1 18.61	1.8855	7 58 10.3	12.247
10	8 31 28.98	1.9557	16 35 47.5	9.555	10	10 3 11.73	1.8853	7 45 54.2	12.289
11	8 33 26.25	1.9532	16 26 12.2	9.624	11	10 5 4.85	1.8852	7 33 35.6	12.331
12	8 35 23.37	1.9507	16 16 32.6	9.695	12	10 6 57.96	1.8852	7 21 14.5	12.372
13	8 37 20.33	1.9482	16 6 48.8	9.766	13	10 8 51.07	1.8852	7 8 51.0	12.412
14	8 39 17.15	1.9457	15 57 0.7	9.836	14	10 10 44.18	1.8852	6 56 25.0	12.452
15	8 41 13.82	1.9433	15 47 8.5	9.905	15	10 12 37.30	1.8854	6 43 56.7	12.491
16	8 43 10.34	1.9409	15 37 12.1	9.973	16	10 14 30.43	1.8857	6 31 26.1	12.530
17	8 45 6.73	1.9386	15 27 11.7	10.040	17	10 16 23.58	1.8859	6 18 53.1	12.568
18	8 47 2.97	1.9363	15 17 7.3	10.108	18	10 18 16.74	1.8863	6 6 17.9	12.605
19	8 48 59.08	1.9341	15 6 58.8	10.175	19	10 20 9.93	1.8867	5 53 40.5	12.642
20	8 50 55.06	1.9318	14 56 46.3	10.241	20	10 22 3.14	1.8871	5 41 0.9	12.677
21	8 52 50.90	1.9297	14 46 29.9	10.306	21	10 23 56.38	1.8876	5 28 19.2	12.712
22	8 54 46.62	1.9276	14 36 9.6	10.370	22	10 25 49.65	1.8883	5 15 35.4	12.747
23	8 56 42.21	1.9254	N. 14 25 45.5	10.433	23	10 27 42.97	1.8890	N. 5 2 49.5	12.781
SUNDAY 6.					TUESDAY 8.				
0	8 58 37.67	1.9234	N. 14 15 17.6	10.497	0	10 29 36.33	1.8897	N. 4 50 1.7	12.813
1	9 0 33.02	1.9215	14 4 45.8	10.561	1	10 31 29.73	1.8905	4 37 11.9	12.847
2	9 2 28.25	1.9195	13 54 10.3	10.623	2	10 33 23.19	1.8914	4 24 20.1	12.878
3	9 4 23.36	1.9176	13 43 31.1	10.684	3	10 35 16.70	1.8923	4 11 26.5	12.909
4	9 6 18.36	1.9158	13 32 48.2	10.745	4	10 37 10.27	1.8933	3 58 31.0	12.940
5	9 8 13.25	1.9140	13 22 1.7	10.805	5	10 39 3.90	1.8943	3 45 33.7	12.969
6	9 10 8.04	1.9122	13 11 11.6	10.865	6	10 40 57.59	1.8955	3 32 34.7	12.998
7	9 12 2.72	1.9105	13 0 17.9	10.924	7	10 42 51.36	1.8967	3 19 33.9	13.027
8	9 13 57.30	1.9088	12 49 20.7	10.983	8	10 44 45.20	1.8980	3 6 31.5	13.054
9	9 15 51.78	1.9072	12 38 20.0	11.041	9	10 46 39.12	1.8994	2 53 27.4	13.081
10	9 17 46.17	1.9057	12 27 15.8	11.098	10	10 48 33.13	1.9008	2 40 21.8	13.107
11	9 19 40.47	1.9042	12 16 8.2	11.155	11	10 50 27.22	1.9023	2 27 14.6	13.132
12	9 21 34.68	1.9028	12 4 57.2	11.211	12	10 52 21.40	1.9038	2 14 6.0	13.155
13	9 23 28.81	1.9014	11 53 42.9	11.266	13	10 54 15.68	1.9055	2 0 56.0	13.179
14	9 25 22.85	1.9000	11 42 25.3	11.321	14	10 56 10.06	1.9072	1 47 44.5	13.202
15	9 27 16.81	1.8988	11 31 4.4	11.376	15	10 58 4.55	1.9090	1 34 31.7	13.224
16	9 29 10.70	1.8976	11 19 40.2	11.429	16	10 59 59.14	1.9108	1 21 17.6	13.246
17	9 31 4.52	1.8964	11 8 12.9	11.482	17	11 1 53.85	1.9127	1 8 2.2	13.267
18	9 32 58.27	1.8952	10 56 42.4	11.535	18	11 3 48.67	1.9147	0 54 45.6	13.286
19	9 34 51.95	1.8942	10 45 8.7	11.587	19	11 5 43.62	1.9168	0 41 27.9	13.305
20	9 36 45.57	1.8932	10 33 32.0	11.637	20	11 7 38.69	1.9189	0 28 9.0	13.323
21	9 38 39.14	1.8923	10 21 52.3	11.687	21	11 9 33.89	1.9211	0 14 49.1	13.340
22	9 40 32.65	1.8913	10 10 9.5	11.738	22	11 11 29.22	1.9233	N. 0 1 28.2	13.357
23	9 42 26.10	1.8905	9 58 23.7	11.787	23	11 13 24.69	1.9257	S. 0 11 53.7	13.373
24	9 44 19.51	1.8898	N. 9 46 35.0	11.836	24	11 15 20.31	1.9282	S. 0 25 16.5	13.387

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 9.					FRIDAY 11.				
0	11 15 20.31	1.9282	S. 0 25 16.5	13.387	0	12 52 4.45	2.1300	S. 11 6 9.7	12.883
1	11 17 16.07	1.9307	0 38 40.1	13.401	1	12 54 12.43	2.1359	11 19 1.6	12.843
2	11 19 11.99	1.9333	0 52 4.6	13.414	2	12 56 20.76	2.1419	11 31 50.9	12.801
3	11 21 8.07	1.9359	1 5 29.8	13.426	3	12 58 29.46	2.1480	11 44 37.7	12.758
4	11 23 4.30	1.9386	1 18 55.7	13.437	4	13 0 38.52	2.1540	11 57 21.9	12.713
5	11 25 0.70	1.9414	1 32 22.2	13.447	5	13 2 47.94	2.1601	12 10 3.3	12.666
6	11 26 57.27	1.9443	1 45 49.4	13.457	6	13 4 57.73	2.1663	12 22 41.8	12.618
7	11 28 54.01	1.9472	1 59 17.1	13.465	7	13 7 7.90	2.1726	12 35 17.5	12.569
8	11 30 50.93	1.9502	2 12 45.2	13.473	8	13 9 18.44	2.1789	12 47 50.1	12.518
9	11 32 48.04	1.9533	2 26 13.8	13.480	9	13 11 29.37	2.1853	13 0 19.6	12.465
10	11 34 45.33	1.9564	2 39 42.8	13.485	10	13 13 40.68	2.1917	13 12 45.9	12.411
11	11 36 42.81	1.9597	2 53 12.0	13.489	11	13 15 52.37	2.1981	13 25 8.9	12.356
12	11 38 40.49	1.9630	3 6 41.5	13.493	12	13 18 4.45	2.2046	13 37 28.6	12.298
13	11 40 38.37	1.9664	3 20 11.2	13.497	13	13 20 16.92	2.2112	13 49 44.7	12.239
14	11 42 36.46	1.9698	3 33 41.1	13.498	14	13 22 29.79	2.2178	14 1 57.3	12.179
15	11 44 34.75	1.9733	3 47 11.0	13.498	15	13 24 43.05	2.2244	14 14 6.2	12.117
16	11 46 33.26	1.9769	4 0 40.9	13.498	16	13 26 56.72	2.2312	14 26 11.3	12.053
17	11 48 31.98	1.9806	4 14 10.8	13.497	17	13 29 10.79	2.2379	14 38 12.5	11.988
18	11 50 30.93	1.9844	4 27 40.6	13.496	18	13 31 25.27	2.2447	14 50 9.8	11.921
19	11 52 30.11	1.9882	4 41 10.3	13.493	19	13 33 40.15	2.2514	15 2 3.0	11.852
20	11 54 29.52	1.9921	4 54 39.7	13.488	20	13 35 55.44	2.2583	15 13 52.1	11.782
21	11 56 29.16	1.9960	5 8 8.8	13.483	21	13 38 11.15	2.2652	15 25 36.9	11.710
22	11 58 29.04	2.0001	5 21 37.6	13.476	22	13 40 27.27	2.2722	15 37 17.3	11.637
23	12 0 29.17	2.0042	S. 5 35 5.9	13.468	23	13 42 43.81	2.2791	S. 15 48 53.3	11.561
THURSDAY 10.					SATURDAY 12.				
0	12 2 29.54	2.0083	S. 5 48 33.8	13.460	0	13 45 0.76	2.2861	S. 16 0 24.6	11.489
1	12 4 30.17	2.0127	6 2 1.1	13.449	1	13 47 18.14	2.2932	16 11 51.3	11.406
2	12 6 31.06	2.0170	6 15 27.7	13.438	2	13 49 35.94	2.3008	16 23 13.3	11.326
3	12 8 32.21	2.0214	6 28 53.7	13.427	3	13 51 54.16	2.3078	16 34 30.4	11.243
4	12 10 33.63	2.0259	6 42 18.9	13.415	4	13 54 12.81	2.3143	16 45 42.5	11.159
5	12 12 35.32	2.0304	6 55 43.3	13.398	5	13 56 31.88	2.3214	16 56 49.5	11.073
6	12 14 37.28	2.0350	7 9 6.7	13.382	6	13 58 51.38	2.3286	17 7 51.3	10.986
7	12 16 39.52	2.0397	7 22 29.2	13.366	7	14 1 11.31	2.3358	17 18 47.8	10.897
8	12 18 42.05	2.0445	7 35 50.6	13.348	8	14 3 31.67	2.3429	17 29 38.9	10.806
9	12 20 44.86	2.0493	7 49 11.0	13.329	9	14 5 52.46	2.3500	17 40 24.5	10.713
10	12 22 47.97	2.0542	8 2 30.1	13.308	10	14 8 13.67	2.3572	17 51 4.5	10.619
11	12 24 51.37	2.0592	8 15 48.0	13.287	11	14 10 35.32	2.3644	18 1 38.8	10.522
12	12 26 55.07	2.0642	8 29 4.5	13.265	12	14 12 57.40	2.3716	18 12 7.2	10.424
13	12 28 59.08	2.0693	8 42 19.6	13.239	13	14 15 19.91	2.3788	18 22 29.7	10.325
14	12 31 3.39	2.0745	8 55 33.2	13.214	14	14 17 42.86	2.3860	18 32 46.2	10.223
15	12 33 8.02	2.0798	9 8 45.3	13.187	15	14 20 6.23	2.3931	18 42 56.5	10.120
16	12 35 12.97	2.0852	9 21 55.7	13.159	16	14 22 30.03	2.4003	18 53 0.6	10.016
17	12 37 18.24	2.0905	9 35 4.4	13.129	17	14 24 54.27	2.4075	19 2 58.4	9.909
18	12 39 23.83	2.0960	9 48 11.2	13.098	18	14 27 18.93	2.4146	19 12 49.7	9.800
19	12 41 29.76	2.1016	10 1 16.2	13.067	19	14 29 44.02	2.4217	19 22 34.4	9.689
20	12 43 36.02	2.1071	10 14 19.2	13.033	20	14 32 9.54	2.4289	19 32 12.4	9.577
21	12 45 42.61	2.1127	10 27 20.1	12.998	21	14 34 35.49	2.4360	19 41 43.7	9.464
22	12 47 49.55	2.1185	10 40 18.9	12.961	22	14 37 1.86	2.4430	19 51 8.1	9.348
23	12 49 56.83	2.1242	10 53 15.4	12.923	23	14 39 28.65	2.4500	20 0 25.5	9.231
24	12 52 4.45	2.1300	S. 11 6 9.7	12.885	24	14 41 55.86	2.4571	S. 20 9 35.8	9.112

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 13.					TUESDAY 15.				
0	14 41 55.86	2.4571	S. 20 9 35.8	9.112	0	16 46 35.73	2.6949	S. 24 39 51.6	1.655
1	14 44 23.50	2.4641	20 18 38.9	8.991	1	16 49 17.48	2.6966	24 41 25.5	1.474
2	14 46 51.55	2.4710	20 27 34.7	8.868	2	16 51 59.32	2.6981	24 42 48.5	1.293
3	14 49 20.02	2.4779	20 36 23.1	8.744	3	16 54 41.25	2.6995	24 44 0.6	1.112
4	14 51 48.90	2.4848	20 45 4.0	8.618	4	16 57 23.26	2.7007	24 45 1.9	0.931
5	14 54 18.19	2.4916	20 53 37.2	8.490	5	17 0 5.34	2.7017	24 45 52.3	0.749
6	14 56 47.89	2.4983	21 2 2.8	8.361	6	17 2 47.47	2.7026	24 46 31.8	0.567
7	14 59 17.99	2.5051	21 10 20.5	8.229	7	17 5 29.65	2.7032	24 47 0.3	0.384
8	15 1 48.50	2.5117	21 18 30.3	8.097	8	17 8 11.86	2.7037	24 47 17.9	0.202
9	15 4 19.40	2.5183	21 26 32.1	7.963	9	17 10 54.10	2.7041	24 47 24.6	- 0.020
10	15 6 50.70	2.5248	21 34 25.8	7.826	10	17 13 36.35	2.7042	24 47 20.3	+ 0.162
11	15 9 22.38	2.5313	21 42 11.2	7.688	11	17 16 18.60	2.7042	24 47 5.1	0.345
12	15 11 54.45	2.5377	21 49 48.4	7.549	12	17 19 0.86	2.7041	24 46 38.9	0.528
13	15 14 26.91	2.5441	21 57 17.1	7.408	13	17 21 43.09	2.7037	24 46 1.7	0.711
14	15 16 59.74	2.5503	22 4 37.3	7.266	14	17 24 25.30	2.7032	24 45 13.6	0.893
15	15 19 32.95	2.5565	22 11 49.0	7.122	15	17 27 7.47	2.7025	24 44 14.6	1.074
16	15 22 6.52	2.5625	22 18 51.9	6.975	16	17 29 49.60	2.7017	24 43 4.7	1.256
17	15 24 40.45	2.5683	22 25 46.0	6.827	17	17 32 31.67	2.7006	24 41 43.9	1.438
18	15 27 14.74	2.5745	22 32 31.2	6.679	18	17 35 13.67	2.6993	24 40 12.2	1.619
19	15 29 49.39	2.5803	22 39 7.5	6.529	19	17 37 55.59	2.6980	24 38 29.6	1.800
20	15 32 24.38	2.5860	22 45 34.7	6.377	20	17 40 37.43	2.6965	24 36 36.2	1.981
21	15 34 59.71	2.5917	22 51 52.7	6.224	21	17 43 19.17	2.6948	24 34 31.9	2.161
22	15 37 35.38	2.5972	22 58 1.6	6.070	22	17 46 0.80	2.6929	24 32 16.9	2.340
23	15 40 11.37	2.6025	S. 23 4 1.1	5.913	23	17 48 42.32	2.6909	S. 24 29 51.1	2.519
MONDAY 14.					WEDNESDAY 16.				
0	15 42 47.68	2.6078	S. 23 9 51.2	5.756	0	17 51 23.71	2.6887	S. 24 27 14.6	2.698
1	15 45 24.31	2.6131	23 15 31.8	5.597	1	17 54 4.96	2.6863	24 24 27.4	2.876
2	15 48 1.25	2.6181	23 21 2.9	5.437	2	17 56 46.07	2.6839	24 21 29.5	3.053
3	15 50 38.48	2.6230	23 26 24.3	5.276	3	17 59 27.03	2.6812	24 18 21.0	3.230
4	15 53 16.01	2.6279	23 31 36.0	5.113	4	18 2 7.82	2.6784	24 15 1.9	3.406
5	15 55 53.83	2.6327	23 36 37.9	4.950	5	18 4 48.44	2.6755	24 11 32.3	3.581
6	15 58 31.93	2.6373	23 41 30.0	4.785	6	18 7 28.88	2.6724	24 7 52.2	3.755
7	16 1 10.30	2.6417	23 46 12.1	4.618	7	18 10 9.13	2.6692	24 4 1.7	3.928
8	16 3 48.93	2.6459	23 50 44.2	4.452	8	18 12 49.18	2.6658	24 0 0.8	4.102
9	16 6 27.81	2.6501	23 55 6.3	4.283	9	18 15 29.02	2.6623	23 55 49.5	4.273
10	16 9 6.94	2.6542	23 59 18.2	4.114	10	18 18 8.65	2.6586	23 51 28.0	4.443
11	16 11 46.31	2.6581	24 3 20.0	3.945	11	18 20 48.05	2.6548	23 46 56.3	4.612
12	16 14 25.91	2.6618	24 7 11.6	3.773	12	18 23 27.23	2.6509	23 42 14.5	4.782
13	16 17 5.73	2.6654	24 10 52.8	3.600	13	18 26 6.16	2.6468	23 37 22.5	4.950
14	16 19 45.76	2.6689	24 14 23.6	3.427	14	18 28 44.84	2.6426	23 32 20.5	5.116
15	16 22 26.00	2.6722	24 17 44.0	3.253	15	18 31 23.27	2.6383	23 27 8.6	5.281
16	16 25 6.43	2.6754	24 20 54.0	3.078	16	18 34 1.44	2.6339	23 21 46.8	5.446
17	16 27 47.05	2.6784	24 23 53.4	2.903	17	18 36 39.34	2.6293	23 16 15.1	5.609
18	16 30 27.84	2.6812	24 26 42.3	2.727	18	18 39 16.96	2.6247	23 10 33.7	5.771
19	16 33 8.80	2.6839	24 29 20.6	2.549	19	18 41 54.30	2.6200	23 4 42.6	5.932
20	16 35 49.91	2.6864	24 31 48.2	2.372	20	18 44 31.36	2.6152	22 58 41.9	6.092
21	16 38 31.17	2.6888	24 34 5.2	2.193	21	18 47 8.12	2.6102	22 52 31.6	6.250
22	16 41 12.57	2.6910	24 36 11.4	2.014	22	18 49 44.58	2.6051	22 46 11.9	6.406
23	16 43 54.09	2.6930	24 38 6.9	1.835	23	18 52 20.73	2.6000	22 39 42.9	6.562
24	16 46 35.73	2.6949	S. 24 39 51.6	1.655	24	18 54 56.58	2.5948	S. 22 33 4.5	6.717

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 17.					SATURDAY 19.				
0	18 54 56.58	2.5948	S. 22 33 4.5	6.777	0	20 52 27.75	2.2967	S. 14 42 35.1	12.235
1	18 57 32.10	2.5893	22 26 16.9	6.869	1	20 54 45.37	2.2906	14 30 17.5	12.330
2	19 0 7.30	2.5840	22 19 20.2	7.020	2	20 57 2.62	2.2846	14 17 55.5	12.403
3	19 2 42.18	2.5785	22 12 14.5	7.170	3	20 59 19.52	2.2787	14 5 29.2	12.474
4	19 5 16.72	2.5728	22 4 59.8	7.318	4	21 1 36.07	2.2728	13 52 58.6	12.544
5	19 7 50.92	2.5672	21 57 36.3	7.465	5	21 3 52.26	2.2670	13 40 23.9	12.613
6	19 10 24.78	2.5614	21 50 4.0	7.611	6	21 6 8.11	2.2612	13 27 45.1	12.680
7	19 12 58.29	2.5557	21 42 23.0	7.756	7	21 8 23.61	2.2555	13 15 2.3	12.745
8	19 15 31.46	2.5498	21 34 33.3	7.898	8	21 10 38.77	2.2498	13 2 15.7	12.808
9	19 18 4.27	2.5438	21 26 35.2	8.039	9	21 12 53.59	2.2442	12 49 25.3	12.871
10	19 20 36.72	2.5378	21 18 28.6	8.179	10	21 15 8.08	2.2387	12 36 31.2	12.932
11	19 23 8.81	2.5318	21 10 13.7	8.317	11	21 17 22.24	2.2332	12 23 33.5	12.990
12	19 25 40.54	2.5257	21 1 50.6	8.453	12	21 19 36.07	2.2276	12 10 32.4	13.047
13	19 28 11.90	2.5196	20 53 19.4	8.588	13	21 21 49.58	2.2222	11 57 27.9	13.103
14	19 30 42.89	2.5133	20 44 40.1	8.721	14	21 24 2.76	2.2171	11 44 20.0	13.158
15	19 33 13.50	2.5071	20 35 52.9	8.852	15	21 26 15.63	2.2118	11 31 8.9	13.211
16	19 35 43.74	2.5008	20 26 57.9	8.982	16	21 28 28.18	2.2067	11 17 54.7	13.262
17	19 38 13.60	2.4945	20 17 55.1	9.110	17	21 30 40.43	2.2016	11 4 37.4	13.312
18	19 40 43.08	2.4882	20 8 44.7	9.237	18	21 32 52.37	2.1964	10 51 17.2	13.361
19	19 43 12.18	2.4817	19 59 26.7	9.362	19	21 35 4.00	2.1914	10 37 54.1	13.408
20	19 45 40.89	2.4753	19 50 1.3	9.485	20	21 37 15.34	2.1866	10 24 28.3	13.453
21	19 48 9.22	2.4689	19 40 28.5	9.607	21	21 39 26.39	2.1817	10 10 59.7	13.497
22	19 50 37.16	2.4625	19 30 48.5	9.727	22	21 41 37.14	2.1768	9 57 28.6	13.540
23	19 53 4.72	2.4561	S. 19 21 1.3	9.845	23	21 43 47.61	2.1722	S. 9 43 54.9	13.582
FRIDAY 18.					SUNDAY 20.				
0	19 55 31.89	2.4496	S. 19 11 7.1	9.962	0	21 45 57.80	2.1673	S. 9 30 18.8	13.621
1	19 57 58.67	2.4430	19 1 5.9	10.077	1	21 48 7.71	2.1620	9 16 40.4	13.659
2	20 0 25.05	2.4365	18 50 57.9	10.189	2	21 50 17.35	2.1564	9 2 59.7	13.697
3	20 2 51.05	2.4300	18 40 43.2	10.301	3	21 52 26.72	2.1509	8 49 16.8	13.732
4	20 5 16.65	2.4235	18 30 21.8	10.411	4	21 54 35.82	2.1455	8 35 31.8	13.767
5	20 7 41.87	2.4170	18 19 53.9	10.519	5	21 56 44.66	2.1403	8 21 44.8	13.799
6	20 10 6.69	2.4105	18 9 19.5	10.626	6	21 58 53.25	2.1351	8 7 55.9	13.831
7	20 12 31.13	2.4040	17 58 38.8	10.731	7	22 1 1.59	2.1300	7 54 5.1	13.862
8	20 14 55.17	2.3975	17 47 51.8	10.834	8	22 3 9.68	2.1248	7 40 12.5	13.891
9	20 17 18.83	2.3910	17 36 58.7	10.935	9	22 5 17.53	2.1198	7 26 18.2	13.918
10	20 19 42.09	2.3845	17 25 59.6	11.035	10	22 7 25.14	2.1149	7 12 22.3	13.944
11	20 22 4.97	2.3781	17 14 54.5	11.132	11	22 9 32.52	2.1100	6 58 24.9	13.969
12	20 24 27.46	2.3717	17 3 43.7	11.228	12	22 11 39.66	2.1052	6 44 26.0	13.992
13	20 26 49.57	2.3652	16 52 27.1	11.323	13	22 13 46.58	2.1005	6 30 25.8	14.015
14	20 29 11.29	2.3588	16 41 4.9	11.416	14	22 15 53.29	2.0959	6 16 24.2	14.036
15	20 31 32.63	2.3523	16 29 37.2	11.507	15	22 17 59.78	2.0913	6 2 21.5	14.055
16	20 33 53.59	2.3462	16 18 4.0	11.597	16	22 20 6.05	2.0868	5 48 17.6	14.074
17	20 36 14.17	2.3398	16 6 25.5	11.685	17	22 22 12.12	2.0823	5 34 12.6	14.091
18	20 38 34.37	2.3335	15 54 41.8	11.772	18	22 24 17.99	2.0778	5 20 6.7	14.107
19	20 40 54.19	2.3273	15 42 52.9	11.857	19	22 26 23.66	2.0733	5 5 59.8	14.122
20	20 43 13.64	2.3211	15 30 59.0	11.939	20	22 28 29.14	2.0687	4 51 52.1	14.135
21	20 45 32.72	2.3149	15 19 0.2	12.021	21	22 30 34.43	2.0642	4 37 43.6	14.147
22	20 47 51.43	2.3088	15 6 56.5	12.101	22	22 32 39.54	2.0597	4 23 34.4	14.158
23	20 50 9.77	2.3027	14 54 48.1	12.178	23	22 34 44.47	2.0552	4 9 24.6	14.168
24	20 52 27.75	2.2967	S. 14 42 35.1	12.255	24	22 36 49.22	2.0507	S. 3 55 14.3	14.176

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 21.					WEDNESDAY 23.				
0	22 36 49.22	2.0778	S. 3 55 14.3	14.176	0	0 14 40.14	2.0265	N. 7 13 38.9	13.287
1	22 38 53.80	2.0750	3 41 3.5	14.183	1	0 16 41.75	2.0271	7 26 54.8	13.243
2	22 40 58.22	2.0723	3 26 52.3	14.189	2	0 18 43.39	2.0277	7 40 8.1	13.199
3	22 43 2.48	2.0697	3 12 40.8	14.195	3	0 20 45.07	2.0284	7 53 18.7	13.153
4	22 45 6.58	2.0671	2 58 28.9	14.199	4	0 22 46.80	2.0292	8 6 26.5	13.106
5	22 47 10.53	2.0647	2 44 16.9	14.201	5	0 24 48.57	2.0299	8 19 31.4	13.058
6	22 49 14.34	2.0622	2 30 4.8	14.202	6	0 26 50.39	2.0308	8 32 33.5	13.011
7	22 51 18.00	2.0598	2 15 52.6	14.202	7	0 28 52.27	2.0318	8 45 32.7	12.962
8	22 53 21.52	2.0576	2 1 40.5	14.202	8	0 30 54.21	2.0328	8 58 28.9	12.911
9	22 55 24.91	2.0554	1 47 28.4	14.200	9	0 32 56.20	2.0338	9 11 22.0	12.859
10	22 57 28.17	2.0533	1 33 16.5	14.197	10	0 34 58.26	2.0348	9 24 12.0	12.807
11	22 59 31.31	2.0512	1 19 4.8	14.193	11	0 37 0.38	2.0360	9 36 58.9	12.754
12	23 1 34.32	2.0493	1 4 53.4	14.188	12	0 39 2.58	2.0372	9 49 42.5	12.700
13	23 3 37.22	2.0474	0 50 42.3	14.181	13	0 41 4.85	2.0384	10 2 22.9	12.645
14	23 5 40.01	2.0457	0 36 31.7	14.172	14	0 43 7.19	2.0397	10 14 59.9	12.588
15	23 7 42.70	2.0439	0 22 21.6	14.163	15	0 45 9.61	2.0410	10 27 33.5	12.532
16	23 9 45.28	2.0422	S. 0 8 12.1	14.154	16	0 47 12.11	2.0424	10 40 3.7	12.475
17	23 11 47.77	2.0407	N. 0 5 56.9	14.143	17	0 49 14.70	2.0439	10 52 30.5	12.416
18	23 13 50.17	2.0392	0 20 5.1	14.131	18	0 51 17.38	2.0453	11 4 53.6	12.355
19	23 15 52.48	2.0377	0 34 12.6	14.118	19	0 53 20.14	2.0468	11 17 13.1	12.295
20	23 17 54.70	2.0364	0 48 19.3	14.104	20	0 55 23.00	2.0484	11 29 29.0	12.233
21	23 19 56.85	2.0352	1 2 25.1	14.089	21	0 57 25.95	2.0500	11 41 41.1	12.171
22	23 21 58.92	2.0339	1 16 30.0	14.072	22	0 59 29.00	2.0517	11 53 49.5	12.108
23	23 24 0.92	2.0328	N. 1 30 33.8	14.054	23	1 1 32.15	2.0534	N. 12 5 54.1	12.043
TUESDAY 22.					THURSDAY 24.				
0	23 26 2.85	2.0317	N. 1 44 36.5	14.036	0	1 3 35.41	2.0552	N. 12 17 54.7	11.978
1	23 28 4.72	2.0307	1 58 38.1	14.017	1	1 5 38.77	2.0569	12 29 51.4	11.912
2	23 30 6.53	2.0297	2 12 38.5	13.996	2	1 7 42.24	2.0587	12 41 44.1	11.845
3	23 32 8.29	2.0289	2 26 37.6	13.974	3	1 9 45.82	2.0606	12 53 32.8	11.777
4	23 34 10.00	2.0282	2 40 35.4	13.952	4	1 11 49.51	2.0625	13 5 17.3	11.708
5	23 36 11.67	2.0274	2 54 31.8	13.928	5	1 13 53.32	2.0644	13 16 57.7	11.638
6	23 38 13.29	2.0267	3 8 26.8	13.904	6	1 15 57.24	2.0664	13 28 33.9	11.567
7	23 40 14.88	2.0262	3 22 20.3	13.878	7	1 18 1.29	2.0684	13 40 5.8	11.496
8	23 42 16.43	2.0257	3 36 12.2	13.851	8	1 20 5.45	2.0704	13 51 33.4	11.423
9	23 44 17.96	2.0252	3 50 2.4	13.823	9	1 22 9.74	2.0725	14 2 56.6	11.350
10	23 46 19.46	2.0248	4 3 50.9	13.794	10	1 24 14.15	2.0746	14 14 15.4	11.276
11	23 48 20.94	2.0245	4 17 37.7	13.765	11	1 26 18.69	2.0767	14 25 29.7	11.200
12	23 50 22.40	2.0243	4 31 22.7	13.734	12	1 28 23.35	2.0788	14 36 39.4	11.124
13	23 52 23.85	2.0242	4 45 5.8	13.702	13	1 30 28.15	2.0810	14 47 44.6	11.047
14	23 54 25.30	2.0241	4 58 47.0	13.670	14	1 32 33.07	2.0832	14 58 45.1	10.969
15	23 56 26.74	2.0240	5 12 26.2	13.636	15	1 34 38.13	2.0855	15 9 40.9	10.891
16	23 58 28.18	2.0241	5 26 3.3	13.601	16	1 36 43.33	2.0877	15 20 32.0	10.812
17	0 0 29.63	2.0242	5 39 38.3	13.565	17	1 38 48.66	2.0899	15 31 18.3	10.731
18	0 2 31.08	2.0243	5 53 11.1	13.528	18	1 40 54.12	2.0923	15 41 59.7	10.650
19	0 4 32.54	2.0244	6 6 41.7	13.491	19	1 42 59.73	2.0947	15 52 36.3	10.568
20	0 6 34.01	2.0247	6 20 10.0	13.452	20	1 45 5.48	2.0969	16 3 7.9	10.485
21	0 8 35.50	2.0251	6 33 35.9	13.412	21	1 47 11.36	2.0993	16 13 34.5	10.401
22	0 10 37.02	2.0256	6 46 59.4	13.371	22	1 49 17.39	2.1017	16 23 50.0	10.316
23	0 12 38.57	2.0260	7 0 20.4	13.329	23	1 51 23.56	2.1040	16 34 12.4	10.230
24	0 14 40.14	2.0265	N. 7 13 38.9	13.287	24	1 53 29.87	2.1064	N. 16 44 23.6	10.144

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 25.					SUNDAY 27.				
0	h m s	s	N. 16 44 23.6	10.144	0	h m s	s	N. 22 57 23.1	5.141
1	1 53 29.87	2.1064	16 54 29.7	10.057	1	3 37 20.06	2.2128	23 2 28.0	5.082
2	1 55 36.33	2.1088	17 4 30.5	9.969	2	3 39 32.88	2.2143	23 7 25.8	4.993
3	1 57 42.93	2.1112	17 14 26.0	9.880	3	3 41 45.78	2.2158	23 12 16.4	4.784
4	1 59 49.68	2.1137	17 24 16.1	9.791	4	3 43 58.77	2.2172	23 16 59.9	4.665
5	2 1 56.58	2.1162	17 34 0.9	9.701	5	3 46 11.84	2.2185	23 21 36.2	4.544
6	2 4 3.62	2.1186	17 43 40.2	9.609	6	3 48 24.99	2.2198	23 26 5.2	4.423
7	2 6 10.81	2.1211	17 53 14.0	9.517	7	3 50 38.21	2.2210	23 30 27.0	4.302
8	2 8 18.15	2.1236	18 2 42.2	9.424	8	3 52 51.51	2.2222	23 34 41.5	4.181
9	2 10 25.64	2.1261	18 12 4.9	9.331	9	3 55 4.87	2.2233	23 38 48.8	4.061
10	2 12 33.28	2.1285	18 21 21.9	9.236	10	3 57 18.30	2.2243	23 42 48.8	3.938
11	2 14 41.06	2.1309	18 30 33.2	9.141	11	4 1 45.34	2.2252	23 46 41.4	3.817
12	2 16 48.99	2.1333	18 39 38.8	9.045	12	4 3 58.94	2.2271	23 50 26.8	3.695
13	2 18 57.08	2.1356	18 48 38.6	8.948	13	4 6 12.59	2.2279	23 54 4.8	3.572
14	2 21 5.31	2.1384	18 57 32.5	8.850	14	4 8 26.29	2.2287	24 0 58.7	3.449
15	2 23 13.69	2.1409	19 6 20.6	8.752	15	4 10 40.04	2.2295	24 4 14.6	3.327
16	2 25 22.22	2.1434	19 15 2.7	8.653	16	4 12 53.83	2.2301	24 7 23.1	3.203
17	2 27 30.90	2.1458	19 23 38.9	8.553	17	4 15 7.65	2.2306	24 10 24.2	3.080
18	2 29 39.72	2.1482	19 32 9.1	8.453	18	4 17 21.50	2.2311	24 13 17.8	2.956
19	2 31 48.69	2.1507	19 40 33.2	8.352	19	4 19 35.38	2.2316	24 16 4.1	2.832
20	2 33 57.81	2.1532	19 48 51.3	8.250	20	4 21 49.29	2.2320	24 18 42.9	2.709
21	2 36 7.07	2.1556	19 57 3.2	8.147	21	4 24 3.22	2.2323	24 21 14.2	2.584
22	2 38 16.48	2.1580	20 5 8.9	8.043	22	4 26 17.16	2.2325	N. 24 23 38.1	2.460
23	2 40 26.03	2.1603	N. 20 13 8.4	7.940	23	4 28 31.12	2.2327		2.336
SATURDAY 26.					MONDAY 28.				
0	2 44 45.55	2.1631	N. 20 21 1.7	7.835	0	4 30 45.08	2.2328	N. 24 25 54.5	2.222
1	2 46 55.53	2.1674	20 28 48.6	7.729	1	4 32 59.05	2.2328	24 28 3.5	2.097
2	2 49 5.64	2.1697	20 36 29.2	7.624	2	4 35 13.02	2.2328	24 30 5.0	1.968
3	2 51 15.89	2.1720	20 44 3.5	7.517	3	4 37 26.99	2.2327	24 31 59.0	1.838
4	2 53 26.28	2.1743	20 51 31.3	7.409	4	4 39 40.95	2.2326	24 33 45.6	1.714
5	2 55 36.81	2.1766	20 58 52.6	7.301	5	4 41 54.90	2.2324	24 35 24.7	1.589
6	2 57 47.47	2.1787	21 6 7.4	7.193	6	4 44 8.84	2.2321	24 36 56.3	1.465
7	2 59 58.26	2.1809	21 13 15.7	7.084	7	4 46 22.75	2.2317	24 38 20.5	1.341
8	3 2 9.18	2.1831	21 20 17.5	6.974	8	4 48 36.64	2.2313	24 39 37.2	1.216
9	3 4 20.23	2.1852	21 27 12.6	6.863	9	4 50 50.51	2.2308	24 40 46.4	1.092
10	3 6 31.41	2.1873	21 34 1.0	6.752	10	4 53 4.34	2.2302	24 41 48.2	0.967
11	3 8 42.71	2.1894	21 40 42.8	6.641	11	4 55 18.14	2.2296	24 42 42.5	0.842
12	3 10 54.14	2.1915	21 47 17.9	6.528	12	4 57 31.89	2.2288	24 43 29.3	0.718
13	3 13 5.69	2.1935	21 53 46.2	6.416	13	4 59 45.60	2.2282	24 44 8.7	0.594
14	3 15 17.36	2.1954	22 0 7.8	6.302	14	5 1 59.27	2.2273	24 44 40.6	0.470
15	3 17 29.14	2.1973	22 6 22.5	6.187	15	5 4 12.88	2.2264	24 45 5.1	0.347
16	3 19 41.04	2.1993	22 12 30.3	6.073	16	5 6 26.44	2.2254	24 45 22.2	0.223
17	3 21 53.06	2.2012	22 18 31.3	5.959	17	5 8 39.93	2.2243	24 45 31.9	+ 0.099
18	3 24 5.18	2.2029	22 24 25.4	5.843	18	5 10 53.36	2.2232	24 45 34.1	- 0.024
19	3 26 17.41	2.2047	22 30 12.5	5.727	19	5 13 6.72	2.2221	24 45 29.0	0.147
20	3 28 29.74	2.2063	22 35 52.7	5.612	20	5 15 20.01	2.2209	24 45 16.5	0.270
21	3 30 42.17	2.2081	22 41 25.9	5.494	21	5 17 33.23	2.2196	24 44 56.6	0.393
22	3 32 54.71	2.2097	22 46 52.0	5.377	22	5 19 46.36	2.2182	24 44 29.3	0.516
23	3 35 7.34	2.2113	22 52 11.1	5.259	23	5 21 59.41	2.2168	24 43 54.7	0.638
24	3 37 20.06	2.2128	N. 22 57 23.1	5.141	24	5 24 12.37	2.2153	N. 24 43 12.8	0.759





## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
1	$\alpha$ Pegasi W.	81 13 7	3089	82 41 30	3097	84 9 43	3105	85 37 47	3113
	$\alpha$ Arietis W.	37 51 26	2993	39 21 47	3000	40 52 0	3005	42 22 6	3012
	Pollux E.	38 21 56	3051	36 52 46	3068	35 23 57	3085	33 55 29	3104
	MARS E.	46 59 56	3094	45 31 39	3104	44 3 34	3113	42 35 40	3123
	Regulus E.	74 50 21	2958	73 19 15	2966	71 48 20	2975	70 17 36	2984
2	$\alpha$ Pegasi W.	92 55 44	3151	94 22 52	3158	95 49 52	3165	97 16 43	3173
	$\alpha$ Arietis W.	49 50 45	3041	51 20 7	3046	52 49 23	3052	54 18 32	3056
	Aldebaran W.	18 31 9	3457	19 52 21	3401	21 14 36	3359	22 37 39	3326
	MARS E.	35 18 58	3168	33 52 10	3176	32 25 32	3185	30 59 5	3193
	Regulus E.	62 46 35	3024	61 16 52	3031	59 47 18	3038	58 17 52	3045
3	$\alpha$ Arietis W.	61 42 52	3078	63 11 29	3081	64 40 2	3084	66 8 31	3087
	Aldebaran W.	29 40 28	3231	31 6 0	3220	32 31 45	3212	33 57 40	3204
	Regulus E.	50 52 41	3073	49 23 59	3079	47 55 24	3083	46 26 54	3088
	Spica E.	104 52 51	3059	103 23 51	3064	101 54 57	3067	100 26 7	3070
	JUPITER E.	107 30 42	3158	106 3 43	3163	104 36 49	3166	103 9 59	3168
	SUN E.	123 33 58	3455	122 12 44	3460	120 51 35	3463	119 30 30	3466
4	$\alpha$ Arietis W.	73 30 17	3094	74 58 34	3095	76 26 50	3094	77 55 7	3094
	Aldebaran W.	41 9 21	3174	42 36 1	3169	44 2 47	3164	45 29 39	3160
	Regulus E.	39 5 38	3105	37 37 35	3108	36 9 35	3110	34 41 38	3114
	Spica E.	93 2 45	3079	91 34 10	3080	90 5 36	3080	88 37 2	3080
	JUPITER E.	95 56 31	3178	94 29 55	3178	93 3 19	3178	91 36 43	3178
	SUN E.	112 45 43	3474	111 24 50	3475	110 3 58	3474	108 43 5	3474
5	$\alpha$ Arietis W.	85 16 51	3084	86 45 20	3081	88 13 53	3077	89 42 31	3073
	Aldebaran W.	52 45 26	3133	54 12 55	3129	55 40 30	3123	57 8 12	3116
	Spica E.	81 13 55	3071	79 45 10	3069	78 16 22	3065	76 47 29	3060
	JUPITER E.	84 23 26	3168	82 56 39	3166	81 29 49	3162	80 2 54	3158
	SUN E.	101 58 21	3463	100 37 16	3460	99 16 7	3455	97 54 53	3451
6	$\alpha$ Arietis W.	97 7 5	3045	98 36 22	3039	100 5 47	3031	101 35 21	3023
	Aldebaran W.	64 28 46	3080	65 57 20	3071	67 26 5	3063	68 55 0	3054
	Pollux W.	23 9 27	3276	24 34 6	3242	25 59 25	3213	27 25 19	3185
	Spica E.	69 21 37	3033	67 52 5	3026	66 22 24	3018	64 52 34	3010
	JUPITER E.	72 46 56	3131	71 19 24	3124	69 51 43	3117	68 23 54	3109
	SUN E.	91 7 13	3419	89 45 18	3412	88 23 15	3403	87 1 2	3395
7	Aldebaran W.	76 22 32	3003	77 52 41	2992	79 23 4	2980	80 53 42	2968
	Pollux W.	34 42 14	3075	36 10 54	3056	37 39 58	3037	39 9 25	3019
	MARS W.	22 53 42	3127	24 21 19	3111	25 49 15	3095	27 17 31	3078
	Spica E.	57 20 46	2965	55 49 49	2954	54 18 39	2943	52 47 15	2932
	JUPITER E.	61 2 17	3065	59 33 24	3055	58 4 19	3045	56 35 2	3034
	SUN E.	80 7 18	3344	78 43 57	3332	77 20 22	3320	75 56 34	3307
8	Aldebaran W.	88 30 46	2903	90 3 1	2890	91 35 33	2875	93 8 24	2861
	Pollux W.	46 42 10	2932	48 13 48	2914	49 45 49	2897	51 18 12	2880
	MARS W.	34 43 48	2998	36 14 3	2982	37 44 38	2965	39 15 34	2950
	Spica E.	45 6 33	2871	43 33 37	2858	42 0 24	2845	40 26 54	2831
	JUPITER E.	49 5 8	2977	47 34 26	2965	46 3 29	2953	44 32 17	2940
	SUN E.	68 53 42	3238	67 28 18	3224	66 2 37	3209	64 36 38	3195

GREENWICH MEAN TIME.

LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	$\alpha$ Pegasi	W.	87 5 41	3120	88 33 26	3129	90 1 1	3136	91 28 27	3143
	$\alpha$ Arietis	W.	43 52 4	3018	45 21 55	3023	46 51 39	3029	48 21 16	3035
	Pollux	E.	32 27 24	3123	30 59 42	3144	29 32 26	3168	28 5 38	3193
	MARS	E.	41 7 58	3131	39 40 26	3141	38 13 6	3150	36 45 57	3158
	Regulus	E.	68 47 3	2993	67 16 41	3001	65 46 29	3009	64 16 27	3017
2	$\alpha$ Pegasi	W.	98 43 25	3179	100 9 59	3186	101 36 25	3193	103 2 43	3199
	$\alpha$ Arietis	W.	55 47 35	3061	57 16 32	3065	58 45 24	3070	60 14 10	3073
	Aldebaran	W.	24 1 20	3300	25 25 32	3276	26 50 11	3259	28 15 11	3244
	MARS	E.	29 32 48	3203	28 6 42	3211	26 40 46	3220	25 15 1	3229
	Regulus	E.	56 48 35	3052	55 19 26	3057	53 50 24	3065	52 21 29	3069
3	$\alpha$ Arietis	W.	67 36 57	3089	69 5 20	3091	70 33 41	3092	72 2 0	3094
	Aldebaran	W.	35 23 45	3197	36 49 58	3190	38 16 19	3184	39 42 47	3179
	Regulus	E.	44 58 30	3092	43 30 11	3096	42 1 56	3099	40 33 46	3101
	Spica	E.	98 57 21	3073	97 28 38	3075	95 59 58	3078	94 31 21	3078
	JUPITER	E.	101 43 12	3171	100 16 28	3173	98 49 47	3175	97 23 8	3177
4	SUN	E.	118 9 28	3469	116 48 29	3471	115 27 32	3472	114 6 37	3473
	$\alpha$ Arietis	W.	79 23 24	3092	80 51 43	3091	82 20 3	3089	83 48 26	3087
	Aldebaran	W.	46 56 36	3155	48 23 39	3149	49 50 49	3145	51 18 4	3139
	Regulus	E.	33 13 45	3116	31 45 55	3118	30 18 7	3120	28 50 22	3123
	Spica	E.	87 8 28	3079	85 39 53	3078	84 11 16	3076	82 42 37	3073
5	JUPITER	E.	90 10 7	3177	88 43 30	3175	87 16 51	3173	85 50 10	3171
	SUN	E.	107 22 12	3472	106 1 17	3471	104 40 21	3469	103 19 22	3467
	$\alpha$ Arietis	W.	91 11 13	3069	92 40 1	3064	94 8 55	3058	95 37 56	3052
	Aldebaran	W.	58 36 2	3170	60 4 0	3103	61 32 6	3096	63 0 21	3087
	Spica	E.	75 18 31	3056	73 49 28	3051	72 20 18	3045	70 51 1	3039
6	JUPITER	E.	78 35 54	3153	77 8 49	3148	75 41 38	3143	74 14 21	3137
	SUN	E.	96 33 34	3446	95 12 9	3440	93 50 38	3433	92 28 59	3427
	$\alpha$ Arietis	W.	103 5 5	3015	104 34 59	3006	106 5 4	2997	107 35 20	2987
	Aldebaran	W.	70 24 6	3044	71 53 24	3034	73 22 54	3025	74 52 36	3014
	Pollux	W.	28 51 46	3161	30 18 42	3137	31 46 7	3115	33 13 58	3095
7	Spica	E.	63 22 34	3002	61 52 24	2993	60 22 3	2984	58 51 30	2975
	JUPITER	E.	66 55 55	3101	65 27 47	3092	63 59 28	3085	62 30 58	3074
	SUN	E.	85 38 40	3386	84 16 7	3375	82 53 22	3365	81 30 26	3355
	Aldebaran	W.	82 24 35	2955	83 55 44	2943	85 27 8	2930	86 58 49	2917
	Pollux	W.	40 39 14	3001	42 9 25	2984	43 39 58	2966	45 10 53	2949
8	MARS	W.	28 46 7	3002	30 15 3	3047	31 44 18	3030	33 13 53	3014
	Spica	E.	51 15 37	2920	49 43 44	2909	48 11 36	2896	46 39 12	2884
	JUPITER	E.	55 5 31	3022	53 35 46	3012	52 5 48	3000	50 35 35	2989
	SUN	E.	74 32 31	3294	73 8 13	3281	71 43 39	3267	70 18 49	3253
	Aldebaran	W.	94 41 33	2846	96 15 1	2831	97 48 48	2816	99 22 55	2801
	Pollux	W.	52 50 57	2862	54 24 4	2845	55 57 33	2828	57 31 25	2810
	MARS	W.	40 46 50	2933	42 18 27	2916	43 50 26	2899	45 22 46	2881
	Spica	E.	38 53 6	2817	37 19 0	2803	35 44 36	2798	34 9 54	2775
	JUPITER	E.	43 0 49	2929	41 29 7	2916	39 57 9	2905	38 24 56	2893
	SUN	E.	63 10 20	3178	61 43 44	3161	60 16 48	3145	58 49 33	3128

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## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
9	Aldebaran	W.	100 57 21	2786	102 32 7	2770	104 7 14	2754	105 42 42	2739
	Pollux	W.	59 5 40	2792	60 40 18	2775	62 15 19	2757	63 50 43	2739
	MARS	W.	46 55 29	2864	48 28 34	2847	50 2 1	2829	51 35 51	2812
	SUN	E.	57 21 57	3111	55 54 1	3094	54 25 44	3078	52 57 7	3060
10	Pollux	W.	71 53 39	2651	73 31 25	2632	75 9 36	2615	76 48 11	2597
	MARS	W.	59 30 48	2722	61 6 59	2704	62 43 34	2686	64 20 33	2668
	Regulus	W.	34 51 49	2643	36 29 46	2624	38 8 9	2604	39 46 58	2585
	SUN	E.	45 28 39	2973	43 57 52	2956	42 26 44	2939	40 55 14	2921
11	Pollux	W.	85 7 4	2512	86 48 1	2494	88 29 22	2478	90 11 6	2462
	MARS	W.	72 31 30	2579	74 10 54	2562	75 50 41	2545	77 30 52	2527
	Regulus	W.	48 7 33	2493	49 48 56	2476	51 30 43	2458	53 12 55	2441
	SUN	E.	33 12 24	2840	31 38 48	2823	30 4 53	2812	28 30 41	2798
15	SUN	W.	20 18 2	2509	21 59 3	2495	23 40 23	2485	25 21 58	2477
	α Aquilæ	E.	54 54 3	2967	53 23 9	3007	51 53 5	3051	50 23 55	3101
	Fomalhaut	E.	78 59 59	2581	77 20 38	2585	75 41 22	2591	74 2 14	2599
	α Pegasi	E.	98 58 43	2268	97 11 56	2265	95 25 5	2262	93 38 10	2260
16	SUN	W.	33 51 51	2460	35 34 0	2460	37 16 9	2461	38 58 17	2462
	Fomalhaut	E.	65 50 2	2664	64 12 34	2684	62 35 33	2706	60 59 1	2730
	α Pegasi	E.	84 43 20	2264	82 56 28	2268	81 9 41	2272	79 23 0	2277
17	SUN	W.	47 28 5	2481	49 9 45	2486	50 51 18	2492	52 32 42	2498
	SATURN	W.	30 11 53	2224	31 59 45	2225	33 47 35	2229	35 35 20	2233
	VENUS	W.	26 35 0	2098	28 26 3	2100	30 17 2	2103	32 7 57	2107
	Fomalhaut	E.	53 5 35	2897	51 33 12	2942	50 1 46	2991	48 31 22	3046
	α Pegasi	E.	70 31 46	2313	68 46 6	2323	67 0 40	2334	65 15 30	2346
18	SUN	W.	60 57 19	2536	62 37 42	2543	64 17 52	2554	65 57 50	2564
	SATURN	W.	44 32 10	2264	46 19 3	2270	48 5 46	2279	49 52 17	2287
	VENUS	W.	41 20 50	2133	43 10 59	2139	45 0 59	2145	46 50 49	2153
	α Pegasi	E.	56 34 18	2418	54 51 9	2436	53 8 26	2455	51 26 10	2476
	α Arietis	E.	98 41 9	2229	96 53 25	2238	95 5 54	2246	93 18 35	2256
19	SUN	W.	74 14 21	2613	75 52 58	2624	77 31 20	2635	79 9 27	2646
	SATURN	W.	58 41 41	2332	60 26 54	2342	62 11 53	2351	63 56 38	2361
	VENUS	W.	55 57 13	2190	57 45 55	2198	59 34 25	2207	61 22 42	2215
	α Arietis	E.	84 25 26	2303	82 39 31	2313	80 53 51	2323	79 8 25	2334
20	SUN	W.	87 16 24	2701	88 53 2	2712	90 29 26	2723	92 5 35	2735
	SATURN	W.	72 36 45	2412	74 20 2	2423	76 3 4	2433	77 45 51	2443
	VENUS	W.	70 21 0	2258	72 8 1	2266	73 54 50	2276	75 41 25	2284
	α Arietis	E.	70 25 8	2387	68 41 15	2398	66 57 38	2410	65 14 17	2421
	Aldebaran	E.	103 10 0	2412	101 26 42	2422	99 43 39	2432	98 0 50	2442
21	SUN	W.	100 2 36	2791	101 37 16	2802	103 11 41	2814	104 45 51	2825
	VENUS	W.	84 31 10	2328	86 16 29	2337	88 1 35	2345	89 46 29	2354
	α Aquilæ	W.	44 25 13	2637	45 43 7	2659	47 2 4	2679	48 21 56	2694
	α Arietis	E.	56 41 32	2477	54 59 47	2489	53 18 19	2500	51 37 6	2512
	Aldebaran	E.	89 30 20	2494	87 48 58	2504	86 7 50	2515	84 26 57	2523

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Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
9	Aldebaran	W.	107 18 30	2723	108 54 39	2707	110 31 9	2692	112 8 0	2676
	Pollux	W.	65 26 31	2722	67 2 42	2704	68 39 17	2686	70 16 16	2668
	MARS	W.	53 10 3	2704	54 44 39	2776	56 19 38	2758	57 55 1	2740
	SUN	E.	51 28 8	3043	49 58 48	3026	48 29 7	3008	46 59 4	2990
10	Pollux	W.	78 27 10	2580	80 6 33	2562	81 46 20	2545	83 26 30	2528
	MARS	W.	65 57 56	2650	67 35 43	2632	69 13 55	2615	70 52 30	2596
	Regulus	W.	41 26 14	2566	43 5 56	2548	44 46 3	2530	46 26 35	2511
	SUN	E.	39 23 22	2905	37 51 9	2888	36 18 35	2872	34 45 40	2855
11	Pollux	W.	91 53 13	2446	93 35 42	2431	95 18 33	2415	97 1 46	2401
	MARS	W.	79 11 27	2511	80 52 25	2494	82 33 46	2479	84 15 29	2462
	Regulus	W.	54 55 31	2424	56 38 31	2408	58 21 54	2392	60 5 40	2376
	SUN	E.	26 56 11	2785	25 21 24	2775	23 46 23	2766	22 11 11	2762
15	SUN	W.	27 3 44	2471	28 45 38	2466	30 27 39	2463	32 9 44	2462
	α Aquilæ	E.	48 55 46	3157	47 28 45	3221	46 3 1	3293	44 38 41	3373
	Fomalhaut	E.	72 23 17	2668	70 44 33	2639	69 6 4	2632	67 27 53	2647
	α Pegasi	E.	91 51 12	2260	90 4 13	2260	88 17 14	2260	86 30 16	2262
16	SUN	W.	40 40 23	2465	42 22 26	2468	44 4 24	2472	45 46 17	2475
	Fomalhaut	E.	59 23 1	2757	57 47 37	2767	56 12 52	2820	54 38 50	2856
	α Pegasi	E.	77 36 26	2282	75 50 0	2289	74 3 44	2296	72 17 39	2304
17	SUN	W.	54 13 58	2505	55 55 4	2512	57 36 0	2520	59 16 45	2528
	SATURN	W.	37 22 59	2238	39 10 30	2243	40 57 53	2250	42 45 6	2256
	VENUS	W.	33 58 46	2111	35 49 29	2116	37 40 4	2121	39 30 31	2126
	Fomalhaut	E.	47 2 6	3106	45 34 4	3173	44 7 23	3248	42 42 11	3322
	α Pegasi	E.	63 30 37	2358	61 46 2	2371	60 1 46	2386	58 17 51	2401
18	SUN	W.	67 37 35	2573	69 17 7	2583	70 56 26	2593	72 35 31	2604
	SATURN	W.	51 38 35	2296	53 24 41	2304	55 10 34	2313	56 56 14	2322
	VENUS	W.	48 40 28	2159	50 29 57	2167	52 19 14	2175	54 8 19	2182
	α Pegasi	E.	49 44 23	2498	48 3 7	2522	46 22 24	2548	44 42 17	2576
	α Arietis	E.	91 31 30	2264	89 44 38	2274	87 58 0	2283	86 11 36	2293
19	SUN	W.	80 47 20	2657	82 24 58	2667	84 2 22	2679	85 39 30	2689
	SATURN	W.	65 41 9	2371	67 25 25	2382	69 9 26	2391	70 53 13	2402
	VENUS	W.	63 10 47	2224	64 58 39	2232	66 46 19	2241	68 33 46	2249
	α Arietis	E.	77 23 15	2344	75 38 20	2355	73 53 40	2366	72 9 16	2377
20	SUN	W.	93 41 29	2746	95 17 8	2757	96 52 32	2769	98 27 41	2779
	SATURN	W.	79 28 24	2455	81 10 41	2465	82 52 44	2475	84 34 32	2485
	VENUS	W.	77 27 48	2293	79 13 58	2302	80 59 55	2311	82 45 39	2320
	α Arietis	E.	63 31 12	2432	61 48 23	2443	60 5 50	2455	58 23 33	2466
	Aldebaran	E.	96 18 15	2452	94 35 54	2462	92 53 48	2473	91 11 57	2483
21	SUN	W.	106 19 47	2835	107 53 29	2847	109 26 56	2858	111 0 9	2868
	VENUS	W.	91 31 10	2362	93 15 39	2371	94 59 56	2379	96 44 1	2387
	α Aquilæ	W.	49 42 38	3445	51 4 4	3411	52 26 8	3380	53 48 47	3352
	α Arietis	E.	49 56 10	2524	48 15 30	2535	46 35 6	2548	44 55 0	2560
	Aldebaran	E.	82 46 19	2535	81 5 55	2546	79 25 46	2557	77 45 52	2567

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22	SUN W.	112 33 9	2879	114 5 55	2890	115 38 27	2901	117 10 45	2911
	α Aquilæ W.	55 11 58	3320	56 35 36	3309	57 59 37	3291	59 23 59	3276
	α Arietis E.	43 15 10	2573	41 35 38	2585	39 56 23	2598	38 17 25	2612
	Aldebaran E.	76 6 12	2578	74 26 47	2588	72 47 36	2599	71 8 39	2610
23	SUN W.	124 48 57	2963	126 19 56	2973	127 50 43	2984	129 21 16	2993
	α Aquilæ W.	66 29 34	3226	67 55 12	3221	69 20 56	3218	70 46 44	3214
	Fomalhaut W.	42 18 47	3685	43 35 50	3632	44 53 50	3584	46 12 42	3541
	Aldebaran E.	62 57 34	2663	61 20 4	2675	59 42 50	2685	58 5 50	2697
	Pollux E.	104 47 30	2650	103 9 43	2658	101 32 7	2667	99 54 43	2675
24	α Aquilæ W.	77 56 11	3216	79 22 1	3219	80 47 48	3223	82 13 30	3227
	Fomalhaut W.	52 57 6	3393	54 19 30	3373	55 42 17	3356	57 5 24	3341
	Aldebaran E.	50 4 41	2755	48 29 14	2768	46 54 4	2780	45 19 10	2794
	Pollux E.	91 50 35	2719	90 14 20	2728	88 38 17	2736	87 2 25	2744
	MARS E.	107 32 41	2735	105 57 14	2763	104 21 57	2771	102 46 51	2779
25	α Aquilæ W.	89 20 27	3259	90 45 26	3269	92 10 14	3277	93 34 52	3287
	Fomalhaut W.	64 4 37	3292	65 28 58	3287	66 53 25	3282	68 17 58	3279
	α Pegasi W.	41 47 19	3064	43 16 13	3054	44 45 19	3046	46 14 35	3039
	Aldebaran E.	37 29 19	2870	35 56 22	2889	34 23 49	2908	32 51 40	2928
	Pollux E.	79 5 56	2788	77 31 13	2797	75 56 41	2805	74 22 20	2815
	MARS E.	94 53 58	2819	93 19 55	2827	91 46 2	2835	90 12 19	2843
26	Fomalhaut W.	75 21 13	3277	76 45 51	3279	78 10 27	3282	79 35 0	3285
	α Pegasi E.	53 42 25	3025	55 12 7	3024	56 41 50	3025	58 11 32	3026
	Pollux E.	66 33 29	2859	65 0 18	2868	63 27 18	2877	61 54 30	2887
	MARS E.	82 26 18	2882	80 53 36	2889	79 21 3	2898	77 48 41	2905
	Regulus E.	103 23 9	2824	101 49 12	2832	100 15 26	2840	98 41 50	2847
27	Fomalhaut W.	86 36 32	3311	88 0 31	3318	89 24 22	3325	90 48 5	3332
	α Pegasi W.	65 39 25	3039	67 8 49	3043	68 38 8	3047	70 7 22	3052
	Pollux E.	54 13 36	2936	52 42 3	2946	51 10 42	2957	49 39 35	2967
	MARS E.	70 9 15	2943	68 37 51	2951	67 6 37	2959	65 35 33	2966
	Regulus E.	90 56 15	2886	89 23 38	2893	87 51 10	2901	86 18 52	2909
28	Fomalhaut W.	97 44 12	3379	99 6 52	3391	100 29 19	3402	101 51 33	3414
	α Pegasi W.	77 32 7	3077	79 0 45	3082	80 29 16	3087	81 57 41	3094
	α Arietis W.	34 5 21	2990	35 35 46	2993	37 6 8	2996	38 36 26	3000
	Pollux E.	42 7 27	3026	40 37 46	3039	39 8 21	3052	37 39 13	3068
	MARS E.	58 2 34	3005	56 32 27	3012	55 2 29	3020	53 32 41	3027
	Regulus E.	78 39 45	2945	77 8 23	2953	75 37 11	2960	74 6 8	2967
29	α Pegasi W.	89 17 53	3124	90 45 33	3130	92 13 6	3137	93 40 31	3143
	α Arietis W.	46 6 41	3021	47 36 28	3026	49 6 9	3030	50 35 44	3034
	MARS E.	46 6 2	3065	44 37 10	3073	43 8 28	3082	41 39 56	3089
	Regulus E.	66 33 4	3001	65 2 53	3008	63 32 50	3014	62 2 55	3021
30	α Arietis W.	58 2 18	3056	59 31 21	3060	61 0 19	3065	62 29 12	3069
	Aldebaran W.	26 5 53	3254	27 30 58	3237	28 56 23	3225	30 22 3	3213
	Regulus E.	54 35 16	3052	53 6 7	3056	51 37 4	3062	50 8 8	3068
	Spica E.	108 35 44	3038	107 6 18	3043	105 36 58	3047	104 7 43	3052

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Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
22	SUN W.	118 42 50	2921	120 14 42	2932	121 46 20	2942	123 17 45	2953
	α Aquilæ W.	60 48 39	3262	62 13 35	3251	63 38 44	3242	65 4 4	3233
	α Arietis E.	36 38 46	2625	35 0 25	2640	33 22 24	2655	31 44 43	2670
	Aldebaran E.	69 29 57	2620	67 51 29	2631	66 13 16	2642	64 35 18	2652
23	SUN W.	130 51 37	3004	132 21 45	3014	133 51 41	3024	135 21 24	3034
	α Aquilæ W.	72 12 36	3213	73 38 30	3213	75 4 24	3213	76 30 18	3214
	Fomalhaut W.	47 32 21	3504	48 52 41	3471	50 13 38	3442	51 35 7	3415
	Aldebaran E.	56 29 6	2707	54 52 36	2719	53 16 22	2732	51 40 24	2745
	Pollux E.	98 17 30	2684	96 40 29	2692	95 3 39	2701	93 27 1	2710
24	α Aquilæ W.	83 39 7	3232	85 4 38	3238	86 30 2	3244	87 55 19	3252
	Fomalhaut W.	58 28 48	3328	59 52 27	3316	61 16 20	3306	62 40 24	3299
	Aldebaran E.	43 44 34	2808	42 10 16	2822	40 36 17	2838	39 2 38	2853
	Pollux E.	85 26 44	2753	83 51 15	2762	82 15 57	2771	80 40 51	2779
	MARS E.	101 11 55	2787	99 37 10	2795	98 2 36	2803	96 28 12	2811
25	α Aquilæ W.	94 59 19	3297	96 23 34	3309	97 47 35	3321	99 11 22	3333
	Fomalhaut W.	69 42 34	3276	71 7 13	3276	72 31 53	3276	73 56 33	3276
	α Pegasi W.	47 43 59	3034	49 13 30	3030	50 43 5	3027	52 12 44	3026
	Aldebaran E.	31 19 57	2951	29 48 43	2977	28 18 1	3005	26 47 55	3041
	Pollux E.	72 48 11	2823	71 14 13	2832	69 40 27	2841	68 6 52	2850
	MARS E.	88 38 47	2850	87 5 24	2859	85 32 12	2866	83 59 10	2874
26	Fomalhaut W.	80 59 29	3288	82 23 54	3294	83 48 13	3299	85 12 26	3305
	α Pegasi W.	59 41 12	3028	61 10 50	3030	62 40 25	3033	64 9 57	3036
	Pollux E.	60 21 55	2897	58 49 32	2906	57 17 21	2916	55 45 22	2926
	MARS E.	76 16 28	2912	74 44 25	2920	73 12 32	2928	71 40 49	2935
	Regulus E.	97 8 23	2855	95 35 6	2861	94 1 59	2870	92 29 2	2878
27	Fomalhaut W.	92 11 39	3341	93 35 3	3350	94 58 17	3359	96 21 20	3369
	α Pegasi W.	71 36 31	3056	73 5 34	3060	74 34 32	3066	76 3 23	3072
	Pollux E.	48 8 41	2978	46 38 1	2989	45 7 35	3001	43 37 24	3013
	MARS E.	64 4 38	2974	62 33 53	2981	61 3 17	2989	59 32 51	2997
	Regulus E.	84 46 44	2916	83 14 45	2924	81 42 56	2931	80 11 16	2938
28	Fomalhaut W.	103 13 34	3427	104 35 20	3440	105 56 51	3454	107 18 7	3469
	α Pegasi W.	83 25 58	3100	84 54 8	3106	86 22 10	3112	87 50 5	3118
	α Arietis W.	40 6 39	3004	41 36 47	3007	43 6 51	3012	44 36 49	3017
	Pollux E.	36 10 24	3082	34 41 53	3100	33 13 43	3117	31 45 54	3136
	MARS E.	52 3 2	3035	50 33 33	3043	49 4 13	3051	47 35 3	3058
	Regulus E.	72 35 14	2974	71 4 29	2981	69 33 52	2988	68 3 24	2994
29	α Pegasi W.	95 7 48	3149	96 34 58	3156	98 2 0	3163	99 28 54	3169
	α Arietis W.	52 5 14	3039	53 34 38	3043	55 3 57	3048	56 33 10	3052
	MARS E.	40 11 33	3097	38 43 20	3105	37 15 17	3114	35 47 24	3123
	Regulus E.	60 33 8	3027	59 3 29	3033	57 33 57	3039	56 4 33	3045
30	α Arietis W.	63 58 0	3072	65 26 44	3075	66 55 24	3078	68 24 0	3082
	Aldebaran W.	31 47 57	3204	33 14 2	3196	34 40 16	3189	36 6 38	3183
	Regulus E.	48 39 19	3073	47 10 36	3078	45 42 0	3083	44 13 30	3088
	Spica E.	102 38 34	3056	101 9 30	3060	99 40 31	3063	98 11 36	3068

## AT GREENWICH APPARENT NOON.

Day of the Week.	Day of the Month.	THE SUN'S						Sideral Time of Semi-diameter Passing Meridian.	Equation of Time, to be Subtracted from		Diff. for 1 Hour.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.	Semi-diameter.	Added to Apparent Time.				
Thur.	1	h m s 16 30 41.68	s 10.803	° ' " S. 21 51 57.8	" -23.01	' " s 16 15.99 70.30	m s 10 44.00	s 0.943			
Frid.	2	16 35 1.28	10.830	22 0 57.3	21.95	16 16.13 70.39	10 21.02	0.970			
Sat.	3	16 39 21.52	10.856	22 9 31.4	20.88	16 16.27 70.47	9 57.40	0.996			
SUN.	4	16 43 42.36	10.881	22 17 39.9	-19.81	16 16.40 70.55	9 33.17	1.021			
Mon.	5	16 48 3.80	10.905	22 25 22.3	18.73	16 16.53 70.62	9 8.37	1.045			
Tues.	6	16 52 25.80	10.928	22 32 38.5	17.63	16 16.66 70.69	8 43.00	1.068			
Wed.	7	16 56 48.34	10.950	22 39 28.4	-16.52	16 16.78 70.75	8 17.09	1.090			
Thur.	8	17 1 11.38	10.971	22 45 51.5	15.40	16 16.89 70.81	7 50.66	1.111			
Frid.	9	17 5 34.92	10.990	22 51 47.7	14.28	16 17.00 70.87	7 23.77	1.130			
Sat.	10	17 9 58.90	11.008	22 57 16.8	-13.15	16 17.11 70.92	6 56.42	1.148			
SUN.	11	17 14 23.29	11.024	23 2 18.7	12.01	16 17.22 70.97	6 28.66	1.164			
Mon.	12	17 18 48.06	11.039	23 6 53.1	10.86	16 17.32 71.02	6 0.53	1.179			
Tues.	13	17 23 13.18	11.053	23 10 59.9	-9.71	16 17.42 71.07	5 32.04	1.193			
Wed.	14	17 27 38.62	11.065	23 14 39.0	8.55	16 17.51 71.12	5 3.24	1.205			
Thur.	15	17 32 4.32	11.076	23 17 50.1	7.39	16 17.60 71.16	4 34.18	1.216			
Frid.	16	17 36 30.26	11.085	23 20 33.4	-6.22	16 17.69 71.19	4 4.88	1.225			
Sat.	17	17 40 56.39	11.092	23 22 48.6	5.05	16 17.77 71.21	3 35.39	1.233			
SUN.	18	17 45 22.69	11.098	23 24 35.6	3.87	16 17.85 71.23	3 5.72	1.239			
Mon.	19	17 49 49.11	11.103	23 25 54.5	-2.69	16 17.93 71.25	2 35.94	1.243			
Tues.	20	17 54 15.61	11.106	23 26 45.2	1.52	16 18.00 71.26	2 6.08	1.246			
Wed.	21	17 58 42.18	11.107	23 27 7.6	-0.34	16 18.06 71.27	1 36.16	1.247			
Thur.	22	18 3 8.76	11.107	23 27 1.6	+0.83	16 18.12 71.27	1 6.22	1.247			
Frid.	23	18 7 35.32	11.106	23 26 27.5	2.01	16 18.18 71.27	0 36.29	1.246			
Sat.	24	18 12 1.85	11.104	23 25 25.1	3.19	16 18.23 71.26	0 6.42	1.244			
SUN.	25	18 16 28.29	11.100	23 23 54.4	+4.37	16 18.27 71.24	0 23.39	1.240			
Mon.	26	18 20 54.62	11.095	23 21 55.6	5.54	16 18.31 71.22	0 53.08	1.235			
Tues.	27	18 25 20.81	11.088	23 19 28.6	6.71	16 18.34 71.20	1 22.63	1.228			
Wed.	28	18 29 46.83	11.080	23 16 33.5	+7.88	16 18.36 71.18	1 52.01	1.220			
Thur.	29	18 34 12.66	11.072	23 13 10.4	9.04	16 18.38 71.16	2 21.20	1.211			
Frid.	30	18 38 38.26	11.062	23 9 19.4	10.20	16 18.39 71.13	2 50.18	1.201			
Sat.	31	18 43 3.61	11.050	23 5 0.6	11.36	16 18.40 71.09	3 18.89	1.190			
SUN.	32	18 47 28.68	11.037	S. 23 0 14.0	+12.52	16 18.40 71.04	3 47.32	1.178			

NOTE.—The mean time of semidiameter passing may be found by subtracting 0.19 from the sideral time.

The sign — prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.



## AT GREENWICH MEAN NOON.

Day of the Week.	Day of the Month.	THE SUN'S				Equation of Time, to be Added to	Diff. for 1 Hour.	Sidereal Time, or Right Ascension of Mean Sun.
		Apparent Right Ascension.	Diff. for 1 Hour.	Apparent Declination.	Diff. for 1 Hour.			
						Subtracted from Mean Time.		
Thur.	1	<sup>h</sup> 16 <sup>m</sup> 30 <sup>s</sup> 43.61	<sup>s</sup> 10.801	<sup>°</sup> S. 21 <sup>'</sup> 52 <sup>"</sup> 1.9	<sup>"</sup> -22.99	<sup>m</sup> 10 <sup>s</sup> 43.83	<sup>s</sup> 0.943	<sup>h</sup> 16 <sup>m</sup> 41 <sup>s</sup> 27.44
Frid.	2	16 35 3.15	10.827	22 1 1.1	21.94	10 20.85	0.970	16 45 24.00
Sat.	3	16 39 23.32	10.853	22 9 34.9	20.88	9 57.24	0.996	16 49 20.56
SUN.	4	16 43 44.10	10.878	22 17 43.0	-19.80	9 33.01	1.021	16 53 17.11
Mon.	5	16 48 5.46	10.902	22 25 25.1	18.71	9 8.21	1.045	16 57 13.67
Tues.	6	16 52 27.38	10.925	22 32 41.1	17.61	8 42.85	1.068	17 1 10.23
Wed.	7	16 56 49.85	10.947	22 39 30.6	-16.50	8 16.94	1.090	17 5 6.79
Thur.	8	17 1 12.82	10.967	22 45 53.4	15.39	7 50.52	1.111	17 9 3.34
Frid.	9	17 5 36.27	10.986	22 51 49.4	14.27	7 23.63	1.130	17 12 59.90
Sat.	10	17 10 0.17	11.004	22 57 18.3	-13.14	6 56.29	1.148	17 16 56.46
SUN.	11	17 14 24.48	11.021	23 2 19.9	12.00	6 28.54	1.164	17 20 53.02
Mon.	12	17 18 49.17	11.036	23 6 54.2	10.85	6 0.41	1.179	17 24 49.58
Tues.	13	17 23 14.20	11.050	23 11 0.8	-9.70	5 31.93	1.193	17 28 46.13
Wed.	14	17 27 39.55	11.062	23 14 39.7	8.54	5 3.14	1.205	17 32 42.69
Thur.	15	17 32 5.16	11.072	23 17 50.7	7.38	4 34.09	1.216	17 36 39.25
Frid.	16	17 36 31.01	11.081	23 20 33.8	-6.21	4 4.80	1.225	17 40 35.81
Sat.	17	17 40 57.05	11.089	23 22 48.9	5.04	3 35.32	1.233	17 44 32.37
SUN.	18	17 45 23.26	11.095	23 24 35.8	3.87	3 5.66	1.239	17 48 28.92
Mon.	19	17 49 49.59	11.099	23 25 54.6	-2.70	2 35.89	1.243	17 52 25.48
Tues.	20	17 54 16.00	11.102	23 26 45.2	1.52	2 6.04	1.246	17 56 22.04
Wed.	21	17 58 42.47	11.103	23 27 7.6	-0.34	1 36.13	1.247	18 0 18.60
Thur.	22	18 3 8.96	11.103	23 27 1.6	+0.83	1 6.20	1.247	18 4 15.16
Frid.	23	18 7 35.44	11.102	23 26 27.5	2.01	0 36.28	1.246	18 8 11.72
Sat.	24	18 12 1.86	11.100	23 25 25.1	3.19	0 6.42	1.244	18 12 8.28
SUN.	25	18 16 28.21	11.096	23 23 54.5	+4.37	0 23.38	1.240	18 16 4.83
Mon.	26	18 20 54.45	11.090	23 21 55.7	5.54	0 53.06	1.235	18 20 1.39
Tues.	27	18 25 20.55	11.084	23 19 28.8	6.71	1 22.60	1.228	18 23 57.95
Wed.	28	18 29 46.48	11.076	23 16 33.8	+7.87	1 51.97	1.220	18 27 54.51
Thur.	29	18 34 12.22	11.068	23 13 10.8	9.04	2 21.15	1.211	18 31 51.07
Frid.	30	18 38 37.74	11.058	23 9 19.9	10.20	2 50.12	1.201	18 35 47.62
Sat.	31	18 43 3.00	11.047	23 5 1.2	11.36	3 18.82	1.190	18 39 44.18
SUN.	32	18 47 27.98	11.034	S. 23 0 14.9	+12.51	3 47.24	1.178	18 43 40.74

NOTE.—The semidiameter for mean noon may be assumed the same as that for apparent noon.  
 The sign — prefixed to the hourly change of declination indicates that south declinations are increasing; the sign + indicates that south declinations are decreasing.

Diff. for 1 Hour,  
 +9'.8565.  
 (Table III.)

AT GREENWICH MEAN NOON.								
Day of the Month.	Day of the Year.	THE SUN'S				Logarithm of the Radius Vector of the Earth.	Diff. for 1 Hour.	Mean Time of Sidereal Noon.
		TRUE LONGITUDE.		Diff. for 1 Hour.	LATITUDE.			
		$\lambda$	$\lambda'$					
1	335	249 22 11.5	21 9.2	152.10	+ 0.07	9.9937301	-27.2	h m s 7 17 20.72
2	336	250 23 2.6	22 0.1	152.15	- 0.05	9.9936662	26.2	7 13 24.80
3	337	251 23 55.0	22 52.4	152.20	0.17	9.9936046	25.2	7 9 28.89
4	338	252 24 48.8	23 46.0	152.26	- 0.27	9.9935453	-24.3	7 5 32.98
5	339	253 25 43.8	24 40.9	152.32	0.34	9.9934882	23.4	7 1 37.07
6	340	254 26 40.0	25 36.9	152.38	0.39	9.9934330	22.6	6 57 41.16
7	341	255 27 37.6	26 34.3	152.43	- 0.42	9.9933798	-21.8	6 53 45.24
8	342	256 28 36.4	27 32.9	152.48	0.41	9.9933285	21.1	6 49 49.33
9	343	257 29 36.3	28 32.7	152.52	0.36	9.9932788	20.4	6 45 53.42
10	344	258 30 37.4	29 33.6	152.56	- 0.29	9.9932307	-19.7	6 41 57.51
11	345	259 31 39.4	30 35.4	152.60	0.20	9.9931843	19.0	6 38 1.60
12	346	260 32 42.3	31 38.1	152.64	- 0.09	9.9931393	18.3	6 34 5.68
13	347	261 33 46.0	32 41.6	152.67	+ 0.03	9.9930959	-17.7	6 30 9.77
14	348	262 34 50.5	33 46.0	152.70	0.16	9.9930541	17.1	6 26 13.86
15	349	263 35 55.6	34 50.9	152.72	0.31	9.9930137	16.5	6 22 17.95
16	350	264 37 1.1	35 56.2	152.74	+ 0.43	9.9929750	-15.8	6 18 22.04
17	351	265 38 7.2	37 2.1	152.76	0.55	9.9929378	15.1	6 14 26.12
18	352	266 39 13.5	38 8.2	152.77	0.64	9.9929025	14.3	6 10 30.21
19	353	267 40 20.1	39 14.6	152.78	+ 0.71	9.9928691	-13.5	6 6 34.30
20	354	268 41 26.9	40 21.2	152.79	0.75	9.9928378	12.6	6 2 38.38
21	355	269 42 33.9	41 28.0	152.80	0.76	9.9928085	11.7	5 58 42.47
22	356	270 43 41.1	42 35.0	152.80	+ 0.74	9.9927816	-10.7	5 54 46.56
23	357	271 44 48.3	43 42.0	152.81	0.68	9.9927571	9.7	5 50 50.65
24	358	272 45 55.7	44 49.3	152.81	0.61	9.9927352	8.6	5 46 54.74
25	359	273 47 3.1	45 56.5	152.82	+ 0.51	9.9927159	- 7.5	5 42 58.82
26	360	274 48 10.7	47 3.9	152.82	0.39	9.9926994	6.3	5 39 2.91
27	361	275 49 18.4	48 11.4	152.83	0.26	9.9926858	5.1	5 35 7.00
28	362	276 50 26.2	49 19.0	152.83	+ 0.13	9.9926749	- 3.9	5 31 11.09
29	363	277 51 34.2	50 26.9	152.84	0.00	9.9926670	2.7	5 27 15.17
30	364	278 52 42.5	51 35.0	152.85	- 0.12	9.9926619	1.5	5 23 19.26
31	365	279 53 51.0	52 43.3	152.86	0.22	9.9926596	- 0.4	5 19 23.35
32	366	280 54 59.7	53 51.8	152.87	- 0.31	9.9926600	+ 0.7	5 15 27.44
NOTE.—The numbers in column $\lambda$ correspond to the true equinox of the date; in column $\lambda'$ to the mean equinox of January 0 <sup>th</sup> .								Diff. for 1 Hour, —9 <sup>h</sup> .8296. (Table II.)

GREENWICH MEAN TIME.

Day of the Month.	THE MOON'S									
	SEMI- DIAMETER.		HORIZONTAL PARALLAX.				UPPER TRANSIT.		AGE.	
	Neon.	Midnight.	Neon.	Diff. for 1 Hour.	Midnight.	Diff. for 1 Hour.	Meridian of Greenwich.	Diff. for 1 Hour.	Neon.	
	' "	' "	' "	"	' "	"	h m	m	d	
1	14 46.3	14 45.7	54 5.9	-0.25	54 3.8	-0.10	14 54.6	1.93	17.5	
2	14 45.6	14 46.1	54 3.5	+0.06	54 5.2	+0.23	15 39.8	1.84	18.5	
3	14 47.1	14 48.8	54 9.1	0.42	54 15.3	0.61	16 23.1	1.77	19.5	
4	14 51.2	14 54.2	54 23.9	+0.82	54 34.9	+1.02	17 5.1	1.74	20.5	
5	14 57.8	15 2.2	54 48.4	1.23	55 4.4	1.43	17 46.8	1.74	21.5	
6	15 7.2	15 12.9	55 22.9	1.63	55 43.6	1.82	18 29.2	1.80	22.5	
7	15 19.1	15 25.9	56 6.5	+1.99	56 31.4	+2.13	19 13.4	1.90	23.5	
8	15 33.1	15 40.6	56 57.8	2.25	57 25.5	2.34	20 0.7	2.05	24.5	
9	15 48.4	15 56.2	57 54.0	2.38	58 22.7	2.38	20 52.3	2.25	25.5	
10	16 3.9	16 11.3	58 51.0	+2.32	59 18.3	+2.20	21 48.8	2.46	26.5	
11	16 18.3	16 24.6	59 43.8	2.03	60 6.9	1.79	22 50.1	2.64	27.5	
12	16 30.0	16 34.4	60 26.9	1.51	60 43.2	1.18	23 54.5	2.71	28.5	
13	16 37.7	16 39.8	60 55.3	+0.82	61 2.8	+0.43	0		0.0	
14	16 40.6	16 40.1	61 5.7	+0.04	61 3.9	-0.34	0 59.3	2.67	1.0	
15	16 38.3	16 35.5	60 57.5	-0.70	60 46.9	1.03	2 1.7	2.52	2.0	
16	16 31.6	16 26.8	60 32.6	-1.33	60 15.1	-1.57	3 0.0	2.33	3.0	
17	16 21.3	16 15.3	59 55.0	1.75	59 33.0	1.89	3 53.9	2.16	4.0	
18	16 9.0	16 2.4	59 9.6	1.98	58 45.5	2.02	4 44.2	2.04	5.0	
19	15 55.8	15 49.2	58 21.1	-2.02	57 56.9	-1.99	5 32.0	1.96	6.0	
20	15 42.7	15 36.5	57 33.3	1.93	57 10.5	1.85	6 18.7	1.93	7.0	
21	15 30.6	15 25.1	56 48.8	1.75	56 28.4	1.65	7 5.2	1.95	8.0	
22	15 19.8	15 15.0	56 9.2	-1.53	55 51.5	-1.42	7 52.5	1.99	9.0	
23	15 10.6	15 6.5	55 35.2	1.30	55 20.3	1.19	8 41.1	2.05	10.0	
24	15 2.8	14 59.5	55 6.7	1.08	54 54.4	0.97	9 31.0	2.10	11.0	
25	14 56.5	14 53.8	54 43.4	-0.86	54 33.7	-0.76	10 21.8	2.12	12.0	
26	14 51.5	14 49.5	54 25.1	0.66	54 17.7	0.57	11 12.6	2.10	13.0	
27	14 47.8	14 46.4	54 11.4	0.47	54 6.3	0.38	12 2.4	2.05	14.0	
28	14 45.3	14 44.6	54 2.4	-0.28	53 59.7	-0.17	12 50.6	1.96	15.0	
29	14 44.2	14 44.2	53 58.3	-0.06	53 58.2	+0.05	13 36.6	1.87	16.0	
30	14 44.6	14 45.3	53 59.6	+0.18	54 2.5	0.31	14 20.5	1.79	17.0	
31	14 46.6	14 48.3	54 7.1	0.46	54 13.5	0.61	15 2.8	1.74	18.0	
32	14 50.6	14 53.4	54 21.8	+0.77	54 32.1	+0.94	15 44.1	1.72	19.0	

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
THURSDAY 1.					SATURDAY 3.				
0	h m s	s	N. 21 53 53.2	6.094	0	h m s	s	N. 15 22 17.9	9.954
1	7 7 47.04	2.0846	21 47 44.6	6.191	1	8 45 48.12	1.9228	15 12 18.7	10.018
2	7 9 52.01	2.0776	21 41 30.3	6.287	2	8 47 43.41	1.9201	15 2 15.7	10.081
3	7 11 56.77	2.0741	21 35 10.2	6.383	3	8 49 38.53	1.9174	14 52 9.0	10.143
4	7 14 1.32	2.0706	21 28 44.4	6.478	4	8 51 33.50	1.9149	14 41 58.6	10.204
5	7 16 5.66	2.0671	21 22 12.9	6.572	5	8 53 28.32	1.9123	14 31 44.5	10.266
6	7 18 9.79	2.0635	21 15 35.8	6.664	6	8 55 22.98	1.9098	14 21 26.7	10.327
7	7 20 13.71	2.0599	21 8 53.2	6.757	7	8 57 17.50	1.9074	14 11 5.3	10.386
8	7 22 17.41	2.0564	21 2 5.0	6.849	8	8 59 11.87	1.9050	14 0 40.4	10.444
9	7 24 20.90	2.0529	20 55 11.3	6.941	9	9 1 6.10	1.9026	13 50 12.0	10.502
10	7 26 24.18	2.0494	20 48 12.1	7.031	10	9 3 0.18	1.9002	13 39 40.1	10.560
11	7 28 27.25	2.0458	20 41 7.6	7.120	11	9 4 54.13	1.8979	13 29 4.8	10.617
12	7 30 30.11	2.0422	20 33 57.7	7.210	12	9 6 47.93	1.8957	13 18 26.0	10.674
13	7 32 32.75	2.0387	20 26 42.4	7.298	13	9 8 41.61	1.8936	13 7 43.9	10.730
14	7 34 35.18	2.0352	20 19 21.9	7.386	14	9 10 35.16	1.8914	12 56 58.5	10.784
15	7 36 37.40	2.0317	20 11 56.1	7.473	15	9 12 28.58	1.8893	12 46 9.8	10.838
16	7 38 39.41	2.0282	20 4 25.1	7.560	16	9 14 21.87	1.8872	12 35 17.9	10.892
17	7 40 41.20	2.0247	19 56 48.9	7.645	17	9 16 15.04	1.8853	12 24 22.7	10.946
18	7 42 42.79	2.0211	19 49 7.7	7.730	18	9 18 8.10	1.8834	12 13 24.4	10.998
19	7 44 44.16	2.0177	19 41 21.3	7.815	19	9 20 1.05	1.8815	12 2 22.9	11.050
20	7 46 45.32	2.0142	19 33 29.9	7.898	20	9 21 53.88	1.8796	11 51 18.4	11.101
21	7 48 46.28	2.0107	19 25 33.5	7.981	21	9 23 46.60	1.8778	11 40 10.8	11.152
22	7 50 47.02	2.0072	19 17 32.2	8.063	22	9 25 39.22	1.8761	11 29 0.2	11.202
23	7 52 47.56	2.0038	N 19 9 26.0	8.144	23	9 27 31.73	1.8743	N 11 17 46.6	11.251
24	7 54 47.89								
FRIDAY 2.					SUNDAY 4.				
0	h m s	s	N. 19 1 14.9	8.225	0	h m s	s	N. 11 6 30.1	11.299
1	7 56 48.02	2.0004	18 52 59.0	8.305	1	9 29 24.14	1.8727	10 55 10.7	11.348
2	7 58 47.94	1.9970	18 44 38.3	8.385	2	9 31 16.46	1.8712	10 43 48.4	11.396
3	8 0 47.66	1.9936	18 36 12.8	8.463	3	9 33 8.68	1.8697	10 32 23.2	11.444
4	8 2 47.17	1.9902	18 27 42.7	8.541	4	9 35 0.82	1.8682	10 20 55.3	11.488
5	8 4 46.48	1.9868	18 19 7.9	8.618	5	9 36 52.87	1.8668	10 9 24.6	11.534
6	8 6 45.59	1.9835	18 10 28.5	8.695	6	9 38 44.83	1.8654	9 57 51.2	11.579
7	8 8 44.50	1.9802	18 1 44.5	8.771	7	9 40 36.72	1.8642	9 46 15.1	11.623
8	8 10 43.22	1.9770	17 52 56.0	8.846	8	9 42 28.53	1.8629	9 34 36.4	11.667
9	8 12 41.74	1.9737	17 44 3.0	8.921	9	9 44 20.27	1.8618	9 22 55.1	11.710
10	8 14 40.06	1.9704	17 35 5.5	8.994	10	9 46 11.94	1.8607	9 11 11.2	11.753
11	8 16 38.19	1.9672	17 26 3.7	9.067	11	9 48 3.55	1.8596	8 59 24.7	11.795
12	8 18 36.13	1.9640	17 16 57.5	9.139	12	9 49 55.09	1.8585	8 47 35.8	11.836
13	8 20 33.87	1.9608	17 7 47.0	9.211	13	9 51 46.57	1.8576	8 35 44.4	11.877
14	8 22 31.43	1.9577	16 58 32.2	9.282	14	9 53 38.00	1.8567	8 23 50.6	11.917
15	8 24 28.80	1.9547	16 49 13.2	9.352	15	9 55 29.38	1.8559	8 11 54.4	11.957
16	8 26 25.99	1.9516	16 39 50.0	9.422	16	9 57 20.71	1.8552	7 59 55.8	11.995
17	8 28 22.99	1.9485	16 30 22.6	9.491	17	9 59 12.00	1.8545	7 47 55.0	12.033
18	8 30 19.81	1.9456	16 20 51.1	9.559	18	10 1 3.25	1.8538	7 35 51.8	12.072
19	8 32 16.46	1.9426	16 11 15.5	9.627	19	10 2 54.46	1.8532	7 23 46.4	12.108
20	8 34 12.92	1.9396	16 1 35.9	9.693	20	10 4 45.64	1.8527	7 11 38.8	12.144
21	8 36 9.21	1.9367	15 51 52.3	9.760	21	10 6 36.79	1.8523	6 59 29.1	12.180
22	8 38 5.33	1.9339	15 42 4.7	9.826	22	10 8 27.91	1.8519	6 47 17.2	12.216
23	8 40 1.28	1.9311	15 32 13.2	9.890	23	10 10 19.02	1.8517	6 35 3.2	12.250
24	8 41 57.06	1.9283	N 15 22 17.9	9.954	24	10 12 10.11	1.8513	N 6 22 47.2	12.283
25	8 43 52.67	1.9255				10 14 1.18	1.8512		

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
MONDAY 5.					WEDNESDAY 7.				
0	10 14 1.18	1.8512	N. 6 22 47.2	12.883	0	11 43 58.72	1.9253	S. 3 53 31.0	13.125
1	10 15 52.25	1.8511	6 10 29.2	12.317	1	11 45 54.34	1.9287	4 6 38.5	13.125
2	10 17 43.31	1.8510	5 58 9.2	12.350	2	11 47 50.16	1.9321	4 19 46.0	13.123
3	10 19 34.37	1.8510	5 45 47.2	12.382	3	11 49 46.19	1.9357	4 32 53.3	13.120
4	10 21 25.43	1.8511	5 33 23.4	12.413	4	11 51 42.44	1.9393	4 46 0.4	13.117
5	10 23 16.50	1.8512	5 20 57.7	12.444	5	11 53 38.91	1.9430	4 59 7.3	13.112
6	10 25 7.58	1.8514	5 8 30.1	12.475	6	11 55 35.60	1.9468	5 12 13.9	13.107
7	10 26 58.67	1.8517	4 56 0.7	12.504	7	11 57 32.52	1.9507	5 25 20.1	13.101
8	10 28 49.78	1.8521	4 43 29.6	12.533	8	11 59 29.68	1.9547	5 38 26.0	13.094
9	10 30 40.92	1.8525	4 30 56.8	12.561	9	12 1 27.08	1.9586	5 51 31.4	13.085
10	10 32 32.08	1.8529	4 18 22.3	12.588	10	12 3 24.71	1.9627	6 4 36.2	13.076
11	10 34 23.27	1.8534	4 5 46.2	12.615	11	12 5 22.60	1.9669	6 17 40.5	13.067
12	10 36 14.49	1.8541	3 53 8.5	12.642	12	12 7 20.74	1.9712	6 30 44.2	13.056
13	10 38 5.76	1.8548	3 40 29.2	12.668	13	12 9 19.14	1.9755	6 43 47.2	13.043
14	10 39 57.07	1.8556	3 27 48.4	12.693	14	12 11 17.80	1.9799	6 56 49.4	13.030
15	10 41 48.43	1.8564	3 15 6.1	12.717	15	12 13 16.73	1.9844	7 9 50.8	13.016
16	10 43 39.84	1.8573	3 2 22.4	12.740	16	12 15 15.93	1.9890	7 22 51.3	13.001
17	10 45 31.31	1.8583	2 49 37.3	12.763	17	12 17 15.41	1.9937	7 35 50.9	12.985
18	10 47 22.84	1.8593	2 36 50.8	12.787	18	12 19 15.17	1.9984	7 48 49.5	12.967
19	10 49 14.43	1.8604	2 24 2.9	12.808	19	12 21 15.22	2.0032	8 1 47.0	12.949
20	10 51 6.09	1.8617	2 11 13.8	12.829	20	12 23 15.56	2.0081	8 14 43.4	12.930
21	10 52 57.83	1.8629	1 58 23.4	12.850	21	12 25 16.19	2.0131	8 27 38.6	12.910
22	10 54 49.64	1.8642	1 45 31.8	12.869	22	12 27 17.13	2.0182	8 40 32.6	12.888
23	10 56 41.53	1.8656	N. 1 32 39.1	12.888	23	12 29 18.37	2.0233	S. 8 53 25.2	12.865
TUESDAY 6.					THURSDAY 8.				
0	10 58 33.51	1.8671	N. 1 19 45.3	12.906	0	12 31 19.92	2.0285	S. 9 6 16.4	12.842
1	11 0 25.58	1.8687	1 6 50.4	12.924	1	12 33 21.79	2.0337	9 19 6.2	12.817
2	11 2 17.75	1.8703	0 53 54.4	12.942	2	12 35 23.97	2.0391	9 31 54.4	12.790
3	11 4 10.02	1.8720	0 40 57.4	12.958	3	12 37 26.48	2.0446	9 44 41.0	12.763
4	11 6 2.39	1.8738	0 27 59.5	12.973	4	12 39 29.32	2.0501	9 57 26.0	12.735
5	11 7 54.87	1.8756	0 15 0.6	12.988	5	12 41 32.49	2.0557	10 10 9.2	12.705
6	11 9 47.46	1.8776	N. 0 2 0.9	13.002	6	12 43 36.00	2.0613	10 22 50.6	12.674
7	11 11 40.18	1.8796	S. 0 10 59.6	13.015	7	12 45 39.85	2.0671	10 35 30.1	12.642
8	11 13 33.01	1.8816	0 24 0.9	13.028	8	12 47 44.05	2.0729	10 48 7.7	12.609
9	11 15 25.97	1.8838	0 37 3.0	13.040	9	12 49 48.60	2.0788	11 0 43.2	12.574
10	11 17 19.06	1.8860	0 50 5.7	13.051	10	12 51 53.50	2.0847	11 13 16.6	12.538
11	11 19 12.29	1.8883	1 3 9.1	13.062	11	12 53 58.76	2.0907	11 25 47.8	12.502
12	11 21 5.66	1.8907	1 16 13.1	13.071	12	12 56 4.39	2.0969	11 38 16.8	12.463
13	11 22 59.17	1.8931	1 29 17.6	13.080	13	12 58 10.39	2.1031	11 50 43.4	12.424
14	11 24 52.83	1.8957	1 42 22.7	13.088	14	13 0 16.76	2.1093	12 3 7.7	12.383
15	11 26 46.65	1.8983	1 55 28.2	13.096	15	13 2 23.50	2.1156	12 15 29.4	12.340
16	11 28 40.63	1.9010	2 8 34.2	13.103	16	13 4 30.63	2.1220	12 27 48.5	12.297
17	11 30 34.77	1.9038	2 21 40.5	13.108	17	13 6 38.14	2.1284	12 40 5.0	12.252
18	11 32 29.08	1.9066	2 34 47.1	13.113	18	13 8 46.04	2.1350	12 52 18.7	12.205
19	11 34 23.56	1.9094	2 47 54.1	13.117	19	13 10 54.34	2.1417	13 4 29.6	12.157
20	11 36 18.21	1.9124	3 1 1.2	13.120	20	13 13 3.04	2.1483	13 16 37.5	12.108
21	11 38 13.05	1.9156	3 14 8.5	13.123	21	13 15 12.14	2.1550	13 28 42.5	12.057
22	11 40 8.08	1.9188	3 27 16.0	13.125	22	13 17 21.64	2.1618	13 40 44.3	12.004
23	11 42 3.30	1.9220	3 40 23.5	13.125	23	13 19 31.55	2.1686	13 52 43.0	11.952
24	11 43 58.72	1.9253	S. 3 53 31.0	13.125	24	13 21 41.87	2.1755	S. 14 4 38.5	11.897

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
FRIDAY 9.					SUNDAY 11.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	13 21 41.87	2.1755	S. 14 4 38.5	11.897	0	15 14 51.17	2.5439	S. 22 1 4.7	7.286
1	13 23 52.61	2.1825	14 16 30.6	11.839	1	15 17 24.03	2.5513	22 8 17.7	7.146
2	13 26 3.77	2.1896	14 28 19.2	11.781	2	15 19 57.33	2.5586	22 15 22.2	7.004
3	13 28 15.36	2.1967	14 40 4.3	11.722	3	15 22 31.06	2.5658	22 22 18.2	6.862
4	13 30 27.37	2.2038	14 51 45.8	11.661	4	15 25 5.23	2.5730	22 29 5.6	6.717
5	13 32 39.81	2.2110	15 3 23.6	11.598	5	15 27 39.82	2.5801	22 35 44.2	6.570
6	13 34 52.69	2.2182	15 14 57.5	11.533	6	15 30 14.84	2.5872	22 42 14.0	6.422
7	13 37 6.00	2.2255	15 26 27.6	11.467	7	15 32 50.28	2.5941	22 48 34.9	6.273
8	13 39 19.75	2.2329	15 37 53.6	11.400	8	15 35 26.13	2.6008	22 54 46.8	6.122
9	13 41 33.95	2.2403	15 49 15.6	11.332	9	15 38 2.38	2.6076	23 0 49.6	5.969
10	13 43 48.59	2.2477	16 0 33.4	11.260	10	15 40 39.04	2.6142	23 6 43.1	5.814
11	13 46 3.68	2.2552	16 11 46.8	11.188	11	15 43 16.09	2.6207	23 12 27.3	5.657
12	13 48 19.22	2.2628	16 22 55.9	11.114	12	15 45 53.53	2.6272	23 18 2.0	5.500
13	13 50 35.22	2.2704	16 34 0.5	11.038	13	15 48 31.36	2.6336	23 23 27.3	5.341
14	13 52 51.67	2.2780	16 45 0.5	10.961	14	15 51 9.56	2.6398	23 28 42.9	5.180
15	13 55 8.58	2.2857	16 55 55.8	10.882	15	15 53 48.13	2.6458	23 33 48.9	5.018
16	13 57 25.95	2.2934	17 6 46.3	10.801	16	15 56 27.06	2.6518	23 38 45.1	4.854
17	13 59 43.79	2.3012	17 17 31.9	10.719	17	15 59 6.35	2.6577	23 43 31.4	4.689
18	14 2 2.09	2.3089	17 28 12.6	10.635	18	16 1 45.99	2.6634	23 48 7.8	4.522
19	14 4 20.86	2.3167	17 38 48.1	10.549	19	16 4 25.96	2.6690	23 52 34.1	4.354
20	14 6 40.09	2.3245	17 49 18.5	10.462	20	16 7 6.27	2.6745	23 56 50.3	4.186
21	14 8 59.80	2.3324	17 59 43.6	10.373	21	16 9 46.90	2.6798	24 0 56.4	4.016
22	14 11 19.98	2.3402	18 10 3.2	10.282	22	16 12 27.85	2.6850	24 4 52.2	3.843
23	14 13 40.63	2.3481	S. 18 20 17.4	10.189	23	16 15 9.10	2.6900	S. 24 8 37.6	3.670
SATURDAY 10.					MONDAY 12.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	14 16 1.75	2.3560	S. 18 30 25.9	10.094	0	16 17 50.65	2.6949	S. 24 12 12.6	3.496
1	14 18 23.35	2.3640	18 40 28.7	9.998	1	16 20 32.49	2.6997	24 15 37.1	3.320
2	14 20 45.43	2.3720	18 50 25.7	9.900	2	16 23 14.61	2.7043	24 18 51.0	3.143
3	14 23 7.99	2.3799	19 0 16.7	9.800	3	16 25 57.00	2.7087	24 21 54.3	2.966
4	14 25 31.02	2.3878	19 10 1.7	9.699	4	16 28 39.65	2.7130	24 24 46.9	2.787
5	14 27 54.53	2.3958	19 19 40.6	9.596	5	16 31 22.55	2.7171	24 27 28.8	2.607
6	14 30 18.52	2.4038	19 29 13.2	9.490	6	16 34 5.70	2.7210	24 29 59.8	2.427
7	14 32 42.99	2.4117	19 38 39.4	9.382	7	16 36 49.07	2.7247	24 32 20.0	2.246
8	14 35 7.93	2.4197	19 47 59.1	9.273	8	16 39 32.66	2.7283	24 34 29.3	2.063
9	14 37 33.35	2.4277	19 57 12.2	9.163	9	16 42 16.47	2.7318	24 36 27.6	1.880
10	14 39 59.25	2.4357	20 6 18.7	9.051	10	16 45 0.48	2.7350	24 38 14.9	1.696
11	14 42 25.63	2.4436	20 15 18.3	8.936	11	16 47 44.67	2.7381	24 39 51.1	1.511
12	14 44 52.48	2.4515	20 24 11.0	8.820	12	16 50 29.05	2.7411	24 41 16.2	1.325
13	14 47 19.81	2.4594	20 32 56.7	8.702	13	16 53 13.60	2.7438	24 42 30.1	1.139
14	14 49 47.61	2.4673	20 41 35.3	8.582	14	16 55 58.30	2.7463	24 43 32.9	0.954
15	14 52 15.88	2.4751	20 50 6.6	8.461	15	16 58 43.15	2.7486	24 44 24.4	0.764
16	14 54 44.62	2.4829	20 58 30.6	8.338	16	17 1 28.13	2.7507	24 45 4.6	0.577
17	14 57 13.83	2.4907	21 6 47.1	8.212	17	17 4 13.24	2.7527	24 45 33.6	0.389
18	14 59 43.50	2.4984	21 14 56.0	8.084	18	17 6 58.46	2.7545	24 45 51.3	0.200
19	15 2 13.64	2.5062	21 22 57.2	7.956	19	17 9 43.78	2.7562	24 45 57.6	0.011
20	15 4 44.24	2.5138	21 30 50.7	7.826	20	17 12 29.20	2.7576	24 45 52.6	+ 0.178
21	15 7 15.29	2.5213	21 38 36.3	7.693	21	17 15 14.69	2.7588	24 45 36.2	0.367
22	15 9 46.80	2.5289	21 46 13.9	7.559	22	17 18 0.25	2.7598	24 45 8.5	0.557
23	15 12 18.76	2.5364	21 53 43.4	7.423	23	17 20 45.87	2.7607	24 44 29.3	0.748
24	15 14 51.17	2.5439	S. 22 1 4.7	7.286	24	17 23 31.53	2.7613	S. 24 43 38.7	0.938

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
TUESDAY 13.					THURSDAY 15.				
0	17 23 31.53	2.7613	S. 24 43 38.7	0.938	0	19 33 26.66	2.5932	S. 20 29 26.3	9.245
1	17 26 17.23	2.7617	24 42 36.7	1.188	1	19 36 2.18	2.5887	20 20 7.4	9.384
2	17 29 2.94	2.7620	24 41 23.3	1.318	2	19 38 37.31	2.5822	20 10 40.2	9.522
3	17 31 48.67	2.7621	24 39 58.5	1.508	3	19 41 12.05	2.5757	20 1 4.8	9.658
4	17 34 34.39	2.7619	24 38 22.3	1.698	4	19 43 46.40	2.5692	19 51 21.3	9.792
5	17 37 20.10	2.7617	24 36 34.7	1.888	5	19 46 20.35	2.5625	19 41 29.8	9.923
6	17 40 5.79	2.7612	24 34 35.7	2.078	6	19 48 53.90	2.5558	19 31 30.5	10.053
7	17 42 51.44	2.7604	24 32 25.3	2.268	7	19 51 27.05	2.5491	19 21 23.4	10.182
8	17 45 37.04	2.7596	24 30 3.6	2.457	8	19 53 59.79	2.5423	19 11 8.7	10.308
9	17 48 22.59	2.7586	24 27 30.5	2.645	9	19 56 32.13	2.5356	19 0 46.4	10.433
10	17 51 8.07	2.7573	24 24 46.2	2.833	10	19 59 4.06	2.5287	18 50 16.7	10.555
11	17 53 53.46	2.7558	24 21 50.5	3.022	11	20 1 35.57	2.5218	18 39 39.8	10.676
12	17 56 38.76	2.7542	24 18 43.5	3.210	12	20 4 6.67	2.5149	18 28 55.6	10.795
13	17 59 23.96	2.7523	24 15 25.3	3.397	13	20 6 37.36	2.5080	18 18 4.4	10.911
14	18 2 9.04	2.7503	24 11 55.9	3.583	14	20 9 7.63	2.5011	18 7 6.3	11.025
15	18 4 54.00	2.7482	24 8 15.4	3.768	15	20 11 37.49	2.4942	17 56 1.4	11.138
16	18 7 38.82	2.7458	24 4 23.8	3.953	16	20 14 6.93	2.4872	17 44 49.7	11.249
17	18 10 23.50	2.7433	24 0 21.1	4.137	17	20 16 35.95	2.4802	17 33 31.5	11.357
18	18 13 8.02	2.7406	23 56 7.4	4.320	18	20 19 4.56	2.4732	17 22 6.8	11.464
19	18 15 52.37	2.7377	23 51 42.7	4.502	19	20 21 32.74	2.4662	17 10 35.8	11.569
20	18 18 36.55	2.7347	23 47 7.1	4.684	20	20 24 0.51	2.4593	16 58 58.5	11.672
21	18 21 20.54	2.7316	23 42 20.6	4.865	21	20 26 27.86	2.4524	16 47 15.1	11.773
22	18 24 4.34	2.7283	23 37 23.3	5.044	22	20 28 54.80	2.4455	16 35 25.7	11.872
23	18 26 47.94	2.7247	S. 23 32 15.3	5.222	23	20 31 21.32	2.4385	S. 16 23 30.4	11.969
WEDNESDAY 14.					FRIDAY 16.				
0	18 29 31.31	2.7210	S. 23 26 56.6	5.400	0	20 33 47.42	2.4315	S. 16 11 29.4	12.063
1	18 32 14.46	2.7172	23 21 27.3	5.577	1	20 36 13.10	2.4246	15 59 22.8	12.157
2	18 34 57.38	2.7132	23 15 47.4	5.753	2	20 38 38.37	2.4177	15 47 10.6	12.248
3	18 37 40.05	2.7091	23 9 57.0	5.927	3	20 41 3.23	2.4108	15 34 53.0	12.337
4	18 40 22.47	2.7048	23 3 56.2	6.099	4	20 43 27.67	2.4039	15 22 30.2	12.423
5	18 43 4.63	2.7005	22 57 45.1	6.271	5	20 45 51.70	2.3972	15 10 2.2	12.509
6	18 45 46.53	2.6960	22 51 23.7	6.441	6	20 48 15.33	2.3904	14 57 29.1	12.592
7	18 48 28.15	2.6913	22 44 52.2	6.609	7	20 50 38.55	2.3836	14 44 51.1	12.673
8	18 51 9.48	2.6865	22 38 10.6	6.777	8	20 53 1.36	2.3768	14 32 8.3	12.752
9	18 53 50.53	2.6816	22 31 18.9	6.944	9	20 55 23.77	2.3701	14 19 20.8	12.830
10	18 56 31.27	2.6765	22 24 17.3	7.108	10	20 57 45.77	2.3634	14 6 28.7	12.906
11	18 59 11.71	2.6714	22 17 5.9	7.271	11	21 0 7.38	2.3566	13 53 32.1	12.980
12	19 1 51.84	2.6661	22 9 44.8	7.432	12	21 2 28.59	2.3502	13 40 31.1	13.052
13	19 4 31.64	2.6607	22 2 14.0	7.592	13	21 4 49.41	2.3437	13 27 25.9	13.121
14	19 7 11.12	2.6552	21 54 33.7	7.751	14	21 7 9.83	2.3372	13 14 16.6	13.188
15	19 9 50.26	2.6496	21 46 43.9	7.908	15	21 9 29.87	2.3307	13 1 3.3	13.254
16	19 12 29.07	2.6439	21 38 44.7	8.063	16	21 11 49.52	2.3243	12 47 46.1	13.319
17	19 15 7.53	2.6381	21 30 36.3	8.217	17	21 14 8.79	2.3180	12 34 25.0	13.382
18	19 17 45.64	2.6322	21 22 18.7	8.369	18	21 16 27.68	2.3117	12 21 0.3	13.442
19	19 20 23.40	2.6262	21 13 52.0	8.519	19	21 18 46.19	2.3054	12 7 32.0	13.501
20	19 23 0.79	2.6202	21 5 16.4	8.667	20	21 21 4.33	2.2992	11 54 0.2	13.558
21	19 25 37.82	2.6141	20 56 31.9	8.814	21	21 23 22.10	2.2931	11 40 25.0	13.613
22	19 28 14.48	2.6078	20 47 38.7	8.959	22	21 25 39.50	2.2870	11 26 46.6	13.666
23	19 30 50.76	2.6015	20 38 36.8	9.103	23	21 27 56.54	2.2810	11 13 5.1	13.717
24	19 33 26.66	2.5952	S. 20 29 26.3	9.245	24	21 30 13.22	2.2750	S. 10 59 20.5	13.768

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SATURDAY 17.					MONDAY 19.				
0	21 30 13.22	2.2750	S. 10 59 20.5	13.768	0	23 13 53.77	2.0743	N. 0 28 46.2	14.358
1	21 32 29.54	2.2691	10 45 33.0	13.816	1	23 15 58.16	2.0722	0 43 7.1	14.338
2	21 34 45.51	2.2632	10 31 42.6	13.862	2	23 18 2.43	2.0700	0 57 26.8	14.317
3	21 37 1.13	2.2575	10 17 49.5	13.907	3	23 20 6.56	2.0678	1 11 45.2	14.295
4	21 39 16.41	2.2518	10 3 53.8	13.949	4	23 22 10.56	2.0658	1 26 2.2	14.272
5	21 41 31.34	2.2461	9 49 55.6	13.991	5	23 24 14.45	2.0639	1 40 17.8	14.248
6	21 43 45.94	2.2406	9 35 54.9	14.031	6	23 26 18.23	2.0620	1 54 31.9	14.223
7	21 46 0.21	2.2351	9 21 51.9	14.068	7	23 28 21.89	2.0601	2 8 44.5	14.197
8	21 48 14.15	2.2296	9 7 46.7	14.104	8	23 30 25.44	2.0584	2 22 55.5	14.169
9	21 50 27.76	2.2242	8 53 39.4	14.139	9	23 32 28.90	2.0568	2 37 4.8	14.141
10	21 52 41.05	2.2188	8 39 30.0	14.172	10	23 34 32.26	2.0552	2 51 12.4	14.111
11	21 54 54.02	2.2137	8 25 18.7	14.204	11	23 36 35.52	2.0536	3 5 18.1	14.080
12	21 57 6.69	2.2086	8 11 5.5	14.233	12	23 38 38.69	2.0522	3 19 22.0	14.048
13	21 59 19.05	2.2034	7 56 50.7	14.261	13	23 40 41.78	2.0508	3 33 23.9	14.015
14	22 1 31.10	2.1984	7 42 34.2	14.288	14	23 42 44.79	2.0496	3 47 23.8	13.982
15	22 3 42.86	2.1935	7 28 16.1	14.313	15	23 44 47.73	2.0484	4 1 21.7	13.948
16	22 5 54.32	2.1886	7 13 56.6	14.337	16	23 46 50.60	2.0473	4 15 17.5	13.912
17	22 8 5.49	2.1838	6 59 35.7	14.358	17	23 48 53.40	2.0462	4 29 11.1	13.875
18	22 10 16.38	2.1792	6 45 13.6	14.379	18	23 50 56.14	2.0452	4 43 2.5	13.837
19	22 12 26.99	2.1745	6 30 50.2	14.398	19	23 52 58.82	2.0443	4 56 51.6	13.799
20	22 14 37.32	2.1699	6 16 25.8	14.415	20	23 55 1.45	2.0434	5 10 38.4	13.759
21	22 16 47.38	2.1654	6 2 0.4	14.432	21	23 57 4.03	2.0427	5 24 22.7	13.718
22	22 18 57.17	2.1610	5 47 34.0	14.447	22	23 59 6.57	2.0419	5 38 4.6	13.677
23	22 21 6.70	2.1567	S. 5 33 6.8	14.460	23	0 1 9.06	2.0413	N. 5 51 44.0	13.635
SUNDAY 18.					TUESDAY 20.				
0	22 23 15.98	2.1525	S. 5 18 38.8	14.472	0	0 3 11.52	2.0407	N. 6 5 20.8	13.592
1	22 25 25.00	2.1483	5 4 10.2	14.482	1	0 5 13.95	2.0402	6 18 55.0	13.547
2	22 27 33.78	2.1442	4 49 41.0	14.491	2	0 7 16.35	2.0397	6 32 26.5	13.502
3	22 29 42.31	2.1402	4 35 11.3	14.498	3	0 9 18.72	2.0393	6 45 55.2	13.456
4	22 31 50.60	2.1363	4 20 41.2	14.504	4	0 11 21.07	2.0391	6 59 21.2	13.409
5	22 33 58.66	2.1324	4 6 10.8	14.509	5	0 13 23.41	2.0388	7 12 44.3	13.361
6	22 36 6.49	2.1287	3 51 40.1	14.513	6	0 15 25.73	2.0387	7 26 4.5	13.312
7	22 38 14.10	2.1250	3 37 9.2	14.515	7	0 17 28.05	2.0386	7 39 21.8	13.262
8	22 40 21.49	2.1213	3 22 38.3	14.516	8	0 19 30.36	2.0385	7 52 36.0	13.212
9	22 42 28.66	2.1177	3 8 7.3	14.516	9	0 21 32.67	2.0385	8 5 47.2	13.161
10	22 44 35.62	2.1143	2 53 36.4	14.513	10	0 23 34.98	2.0386	8 18 55.3	13.108
11	22 46 42.38	2.1110	2 39 5.7	14.509	11	0 25 37.30	2.0387	8 32 0.1	13.054
12	22 48 48.94	2.1077	2 24 35.3	14.505	12	0 27 39.63	2.0389	8 45 1.8	13.001
13	22 50 55.30	2.1044	2 10 5.1	14.500	13	0 29 41.97	2.0392	8 58 0.2	12.945
14	22 53 1.47	2.1013	1 55 35.3	14.493	14	0 31 44.33	2.0395	9 10 55.2	12.889
15	22 55 7.46	2.0983	1 41 5.9	14.485	15	0 33 46.71	2.0399	9 23 46.9	12.833
16	22 57 13.27	2.0953	1 26 37.1	14.476	16	0 35 49.12	2.0404	9 36 35.2	12.776
17	22 59 18.90	2.0924	1 12 8.8	14.466	17	0 37 51.56	2.0409	9 49 20.0	12.717
18	23 1 24.36	2.0896	0 57 47.2	14.453	18	0 39 54.03	2.0414	10 2 1.2	12.657
19	23 3 29.65	2.0868	0 43 14.4	14.440	19	0 41 56.53	2.0420	10 14 38.9	12.597
20	23 5 34.78	2.0842	0 28 48.4	14.426	20	0 43 59.07	2.0427	10 27 12.9	12.536
21	23 7 39.75	2.0816	S. 0 14 23.3	14.411	21	0 46 1.65	2.0434	10 39 43.2	12.474
22	23 9 44.57	2.0791	N. 0 0 0.9	14.395	22	0 48 4.28	2.0442	10 52 9.8	12.412
23	23 11 49.24	2.0767	0 14 24.1	14.377	23	0 50 6.95	2.0449	11 4 32.6	12.348
24	23 13 53.77	2.0743	N. 0 28 46.2	14.358	24	0 52 9.67	2.0458	N. 11 16 51.6	12.284



## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
WEDNESDAY 21.					FRIDAY 23.				
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"
0	52 9.67	2.0458	N. 11 16 51.6	12.284	0	2 32 8.35	2.1304	N. 19 37 43.9	8.303
1	54 12.45	2.0468	11 29 6.7	12.219	1	2 34 16.24	2.1326	19 45 59.1	8.203
2	56 15.29	2.0478	11 41 17.9	12.153	2	2 36 24.26	2.1347	19 54 8.3	8.103
3	58 18.19	2.0488	11 53 25.1	12.087	3	2 38 32.41	2.1369	20 2 11.5	8.002
4	1 0 21.15	2.0499	12 5 28.3	12.019	4	2 40 40.69	2.1392	20 10 8.5	7.899
5	1 2 24.18	2.0510	12 17 27.4	11.951	5	2 42 49.11	2.1413	20 17 59.4	7.797
6	1 4 27.27	2.0522	12 29 22.4	11.882	6	2 44 57.65	2.1435	20 25 44.1	7.693
7	1 6 30.44	2.0534	12 41 13.2	11.812	7	2 47 6.33	2.1457	20 33 22.6	7.590
8	1 8 33.68	2.0546	12 52 59.8	11.741	8	2 49 15.13	2.1478	20 40 54.9	7.486
9	1 10 36.99	2.0559	13 4 42.1	11.669	9	2 51 24.06	2.1499	20 48 20.9	7.381
10	1 12 40.39	2.0573	13 16 20.1	11.597	10	2 53 33.12	2.1520	20 55 40.6	7.275
11	1 14 43.87	2.0587	13 27 53.8	11.525	11	2 55 42.30	2.1541	21 2 53.9	7.168
12	1 16 47.44	2.0602	13 39 23.1	11.451	12	2 57 51.61	2.1562	21 10 0.8	7.062
13	1 18 51.09	2.0616	13 50 47.9	11.376	13	3 0 1.05	2.1583	21 17 1.3	6.955
14	1 20 54.83	2.0632	14 2 8.2	11.301	14	3 2 10.61	2.1603	21 23 55.4	6.847
15	1 22 58.67	2.0647	14 13 24.0	11.225	15	3 4 20.29	2.1623	21 30 43.0	6.739
16	1 25 2.60	2.0662	14 24 35.2	11.148	16	3 6 30.09	2.1644	21 37 24.1	6.630
17	1 27 6.62	2.0678	14 35 41.8	11.071	17	3 8 40.02	2.1664	21 43 58.6	6.521
18	1 29 10.74	2.0693	14 46 43.7	10.992	18	3 10 50.06	2.1683	21 50 26.6	6.412
19	1 31 14.97	2.0713	14 57 40.8	10.912	19	3 13 0.22	2.1703	21 56 48.0	6.301
20	1 33 19.30	2.0730	15 8 33.2	10.832	20	3 15 10.50	2.1722	22 3 2.7	6.190
21	1 35 23.73	2.0748	15 19 20.7	10.752	21	3 17 20.89	2.1741	22 9 10.8	6.079
22	1 37 28.27	2.0766	15 30 3.4	10.671	22	3 19 31.39	2.1760	22 15 12.2	5.967
23	1 39 32.92	2.0783	N. 15 40 41.2	10.588	23	3 21 42.01	2.1778	N. 22 21 6.8	5.854
THURSDAY 22.					SATURDAY 24.				
0	1 41 37.67	2.0802	N. 15 51 13.9	10.504	0	3 23 52.73	2.1796	N. 22 26 54.7	5.742
1	1 43 42.54	2.0821	16 1 41.7	10.421	1	3 26 3.56	2.1813	22 32 35.8	5.628
2	1 45 47.52	2.0840	16 12 4.4	10.337	2	3 28 14.49	2.1831	22 38 10.1	5.515
3	1 47 52.62	2.0859	16 22 22.1	10.252	3	3 30 25.53	2.1848	22 43 37.6	5.401
4	1 49 57.83	2.0878	16 32 34.6	10.166	4	3 32 36.67	2.1864	22 48 58.2	5.287
5	1 52 3.16	2.0899	16 42 42.0	10.080	5	3 34 47.90	2.1880	22 54 12.0	5.172
6	1 54 8.62	2.0919	16 52 44.2	9.992	6	3 36 59.23	2.1897	22 59 18.8	5.056
7	1 56 14.19	2.0939	17 2 41.1	9.904	7	3 39 10.66	2.1912	23 4 18.7	4.940
8	1 58 19.89	2.0960	17 12 32.7	9.815	8	3 41 22.18	2.1927	23 9 11.6	4.823
9	2 0 25.71	2.0980	17 22 18.9	9.726	9	3 43 33.79	2.1942	23 13 57.5	4.707
10	2 2 31.65	2.1001	17 31 59.8	9.637	10	3 45 45.48	2.1956	23 18 36.5	4.591
11	2 4 37.72	2.1022	17 41 35.3	9.546	11	3 47 57.26	2.1970	23 23 8.4	4.473
12	2 6 43.91	2.1043	17 51 5.3	9.454	12	3 50 9.12	2.1983	23 27 33.3	4.356
13	2 8 50.23	2.1064	18 0 29.8	9.362	13	3 52 21.06	2.1996	23 31 51.1	4.238
14	2 10 56.68	2.1086	18 9 48.7	9.269	14	3 54 33.07	2.2008	23 36 1.9	4.120
15	2 13 3.26	2.1107	18 19 2.1	9.176	15	3 56 45.16	2.2021	23 40 5.5	4.001
16	2 15 9.97	2.1129	18 28 9.8	9.081	16	3 58 57.32	2.2032	23 44 2.0	3.882
17	2 17 16.81	2.1151	18 37 11.8	8.986	17	4 1 9.54	2.2043	23 47 51.4	3.763
18	2 19 23.78	2.1172	18 46 8.1	8.891	18	4 3 21.83	2.2053	23 51 33.6	3.643
19	2 21 30.88	2.1194	18 54 58.7	8.795	19	4 5 34.18	2.2063	23 55 8.6	3.523
20	2 23 38.11	2.1216	19 3 43.5	8.698	20	4 7 46.58	2.2072	23 58 36.4	3.404
21	2 25 45.47	2.1238	19 12 22.4	8.600	21	4 9 59.04	2.2082	24 1 57.1	3.284
22	2 27 52.97	2.1260	19 20 55.5	8.502	22	4 12 11.56	2.2090	24 5 10.5	3.163
23	2 30 0.59	2.1282	19 29 22.7	8.403	23	4 14 24.12	2.2098	24 8 16.7	3.042
24	2 32 8.35	2.1304	N. 19 37 43.9	8.303	24	4 16 36.73	2.2105	N. 24 11 15.6	2.922

## GREENWICH MEAN TIME.

## THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.
SUNDAY 25.					TUESDAY 27.				
0	h m s	s	N. 24 11 15.6	2.922	0	h m s	s	N. 24 11 43.0	2.853
1	4 16 36.73	2.2105	24 14 7.3	2.801	1	6 2 22.87	2.1728	24 8 48.4	2.968
2	4 18 49.38	2.2111	24 16 51.7	2.680	2	6 4 33.17	2.1706	24 5 46.9	3.083
3	4 21 2.06	2.2117	24 19 28.9	2.559	3	6 6 43.34	2.1683	24 2 38.5	3.196
4	4 23 14.78	2.2122	24 21 58.8	2.437	4	6 8 53.37	2.1660	23 59 23.4	3.308
5	4 25 27.53	2.2127	24 24 21.4	2.316	5	6 11 3.26	2.1636	23 56 1.5	3.422
6	4 27 40.31	2.2132	24 26 36.7	2.194	6	6 13 13.00	2.1612	23 52 32.8	3.534
7	4 29 53.12	2.2136	24 28 44.7	2.072	7	6 15 22.60	2.1587	23 48 57.4	3.646
8	4 32 5.94	2.2138	24 30 45.4	1.951	8	6 17 32.04	2.1561	23 45 15.3	3.757
9	4 34 18.78	2.2141	24 32 38.8	1.828	9	6 19 41.33	2.1535	23 41 26.6	3.867
10	4 36 31.63	2.2142	24 34 24.8	1.706	10	6 21 50.46	2.1508	23 37 31.2	3.977
11	4 38 44.49	2.2143	24 36 3.5	1.583	11	6 23 59.43	2.1482	23 33 29.3	4.087
12	4 40 57.35	2.2144	24 37 34.8	1.461	12	6 26 8.24	2.1455	23 29 20.7	4.197
13	4 43 10.22	2.2145	24 38 58.8	1.340	13	6 28 16.89	2.1427	23 25 5.6	4.306
14	4 45 23.09	2.2146	24 40 15.6	1.218	14	6 30 25.37	2.1399	23 20 44.0	4.414
15	4 47 35.95	2.2147	24 41 25.0	1.095	15	6 32 33.68	2.1371	23 16 15.9	4.522
16	4 49 48.80	2.2148	24 42 27.0	0.973	16	6 34 41.82	2.1342	23 11 41.4	4.628
17	4 52 1.64	2.2149	24 43 21.7	0.851	17	6 36 49.79	2.1313	23 7 0.5	4.734
18	4 54 14.47	2.2150	24 44 9.1	0.728	18	6 38 57.58	2.1284	22 57 19.7	4.840
19	4 56 27.27	2.2151	24 45 21.8	0.606	19	6 41 5.20	2.1255	22 52 19.8	4.946
20	4 58 40.04	2.2152	24 46 5.3	0.484	20	6 43 12.64	2.1224	22 47 13.7	5.050
21	5 0 52.79	2.2153	24 47 16.1	0.362	21	6 45 19.89	2.1193	22 42 1.4	5.153
22	5 3 5.51	2.2154	24 48 16.1	0.241	22	6 47 26.96	2.1163	22 36 42.9	5.257
23	5 5 18.19	2.2155	24 49 16.1	0.118	23	6 49 33.85	2.1132		5.360
24	5 7 30.83	2.2156				6 51 40.54	2.1100		
MONDAY 26.					WEDNESDAY 28.				
0	5 9 43.42	2.2095	N. 24 46 19.5	-0.003	0	6 53 47.05	2.1069	N. 22 31 18.2	5.464
1	5 11 55.97	2.2087	24 46 15.7	0.124	1	6 55 53.37	2.1037	22 25 47.4	5.563
2	5 14 8.47	2.2078	24 46 4.6	0.246	2	6 57 59.50	2.1005	22 20 10.6	5.664
3	5 16 20.91	2.2068	24 45 46.2	0.367	3	7 0 5.43	2.0973	22 14 27.7	5.765
4	5 18 33.29	2.2058	24 45 20.5	0.488	4	7 2 11.17	2.0940	22 8 38.8	5.864
5	5 20 45.61	2.2048	24 44 47.6	0.609	5	7 4 16.71	2.0907	22 2 44.0	5.963
6	5 22 57.86	2.2037	24 44 7.4	0.730	6	7 6 22.05	2.0874	21 56 43.3	6.061
7	5 25 10.05	2.2025	24 43 20.0	0.850	7	7 8 27.20	2.0841	21 50 36.7	6.158
8	5 27 22.16	2.2012	24 42 25.4	0.970	8	7 10 32.14	2.0808	21 44 24.3	6.255
9	5 29 34.19	2.1998	24 41 23.6	1.090	9	7 12 36.89	2.0774	21 38 6.1	6.352
10	5 31 46.14	2.1985	24 40 14.6	1.210	10	7 14 41.43	2.0740	21 31 42.1	6.447
11	5 33 58.01	2.1970	24 38 58.4	1.330	11	7 16 45.77	2.0707	21 25 12.4	6.542
12	5 36 9.78	2.1954	24 37 35.0	1.449	12	7 18 49.91	2.0673	21 18 37.1	6.635
13	5 38 21.46	2.1939	24 36 4.5	1.568	13	7 20 53.84	2.0638	21 11 56.2	6.729
14	5 40 33.05	2.1923	24 34 26.9	1.687	14	7 22 57.57	2.0604	21 5 9.6	6.822
15	5 42 44.54	2.1906	24 32 42.1	1.805	15	7 25 1.09	2.0569	20 58 17.5	6.914
16	5 44 55.92	2.1888	24 30 50.3	1.923	16	7 27 4.40	2.0535	20 51 19.9	7.005
17	5 47 7.20	2.1871	24 28 51.4	2.040	17	7 29 7.51	2.0501	20 44 16.9	7.096
18	5 49 18.37	2.1852	24 26 45.5	2.158	18	7 31 10.41	2.0467	20 37 8.4	7.186
19	5 51 29.42	2.1833	24 24 32.5	2.275	19	7 33 13.11	2.0432	20 29 54.6	7.275
20	5 53 40.36	2.1813	24 22 12.5	2.392	20	7 35 15.59	2.0397	20 22 35.4	7.364
21	5 55 51.18	2.1793	24 19 45.5	2.508	21	7 37 17.87	2.0363	20 15 10.9	7.452
22	5 58 1.87	2.1772	24 17 11.6	2.623	22	7 39 19.94	2.0328	20 7 41.2	7.538
23	6 0 12.44	2.1750	24 14 30.8	2.738	23	7 41 21.81	2.0294	20 0 6.3	7.624
24	6 2 22.87	2.1728	N. 24 11 43.0	2.853	24	7 43 23.47	2.0259	N. 19 52 26.3	7.710

GREENWICH MEAN TIME.

THE MOON'S RIGHT ASCENSION AND DECLINATION.

Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.	Hour.	Right Ascension.	Diff. for 1 Minute.	Declination.	Diff. for 1 Minute.																				
THURSDAY 29.					SATURDAY 31.																								
0	h m s	s	° ' "	"	0	h m s	s	° ' "	"																				
0	7 43 23.47	2.0259	N. 19 52 26.3	7.710	0	9 16 54.33	1.8805	N. 12 17 46.3	10.953																				
1	7 45 24.92	2.0224	19 44 41.1	7.795	1	9 18 47.09	1.8783	12 6 47.6	11.003																				
2	7 47 26.16	2.0189	19 36 50.9	7.879	2	9 20 39.72	1.8761	11 55 45.9	11.052																				
3	7 49 27.19	2.0154	19 28 55.6	7.962	3	9 22 32.22	1.8739	11 44 41.3	11.101																				
4	7 51 28.01	2.0120	19 20 55.4	8.044	4	9 24 24.59	1.8718	11 33 33.8	11.148																				
5	7 53 28.63	2.0086	19 12 50.3	8.127	5	9 26 16.84	1.8698	11 22 23.5	11.196																				
6	7 55 29.04	2.0051	19 4 40.2	8.208	6	9 28 8.97	1.8678	11 11 10.3	11.243																				
7	7 57 29.24	2.0017	18 56 25.3	8.288	7	9 30 0.98	1.8658	10 59 54.4	11.288																				
8	7 59 29.24	1.9982	18 48 5.6	8.368	8	9 31 52.87	1.8639	10 48 35.7	11.333																				
9	8 1 29.03	1.9948	18 39 41.1	8.447	9	9 33 44.65	1.8621	10 37 14.4	11.378																				
10	8 3 28.62	1.9915	18 31 12.0	8.525	10	9 35 36.32	1.8603	10 25 50.4	11.422																				
11	8 5 28.01	1.9881	18 22 38.1	8.603	11	9 37 27.88	1.8585	10 14 23.8	11.464																				
12	8 7 27.19	1.9847	18 13 59.6	8.680	12	9 39 19.34	1.8568	10 2 54.7	11.506																				
13	8 9 26.17	1.9813	18 5 16.5	8.756	13	9 41 10.70	1.8552	9 51 23.1	11.548																				
14	8 11 24.95	1.9780	17 56 28.9	8.831	14	9 43 1.96	1.8536	9 39 48.9	11.590																				
15	8 13 23.53	1.9747	17 47 36.8	8.905	15	9 44 53.13	1.8520	9 28 12.3	11.629																				
16	8 15 21.91	1.9714	17 38 40.3	8.979	16	9 46 44.20	1.8505	9 16 33.4	11.668																				
17	8 17 20.10	1.9682	17 29 39.3	9.052	17	9 48 35.19	1.8491	9 4 52.1	11.708																				
18	8 19 18.09	1.9648	17 20 34.0	9.124	18	9 50 26.09	1.8477	8 53 8.4	11.747																				
19	8 21 15.88	1.9616	17 11 24.4	9.196	19	9 52 16.91	1.8463	8 41 22.5	11.784																				
20	8 23 13.48	1.9583	17 2 10.5	9.267	20	9 54 7.65	1.8451	8 29 34.3	11.821																				
21	8 25 10.88	1.9551	16 52 52.4	9.337	21	9 55 58.32	1.8438	8 17 44.0	11.857																				
22	8 27 8.09	1.9520	16 43 30.1	9.406	22	9 57 48.91	1.8427	8 5 51.5	11.893																				
23	8 29 5.12	1.9489	N. 16 34 3.7	9.474	23	9 59 39.44	1.8416	N. 7 53 56.8	11.928																				
FRIDAY 30.					SUNDAY, JANUARY 1, 1899.																								
0	8 31 1.96	1.9458	N. 16 24 33.2	9.542	0	10 1 29.90	1.8405	N. 7 42 0.1	11.962																				
1	8 32 58.61	1.9427	16 14 58.6	9.610	PHASES OF THE MOON.																								
2	8 34 55.08	1.9396	16 5 20.0	9.676																									
3	8 36 51.36	1.9365	15 55 37.5	9.742																									
4	8 38 47.46	1.9335	15 45 51.0	9.807																									
5	8 40 43.38	1.9305	15 36 0.7	9.871	<table><tr><td></td><td>d</td><td>h</td><td>m</td></tr><tr><td>☾ Last Quarter . . . . .</td><td>Dec.</td><td>5</td><td>22 5.6</td></tr><tr><td>● New Moon . . . . .</td><td></td><td>12</td><td>23 43.1</td></tr><tr><td>☾ First Quarter . . . . .</td><td></td><td>19</td><td>15 21.6</td></tr><tr><td>○ Full Moon . . . . .</td><td></td><td>27</td><td>11 39.2</td></tr></table>						d	h	m	☾ Last Quarter . . . . .	Dec.	5	22 5.6	● New Moon . . . . .		12	23 43.1	☾ First Quarter . . . . .		19	15 21.6	○ Full Moon . . . . .		27	11 39.2
	d	h	m																										
☾ Last Quarter . . . . .	Dec.	5	22 5.6																										
● New Moon . . . . .		12	23 43.1																										
☾ First Quarter . . . . .		19	15 21.6																										
○ Full Moon . . . . .		27	11 39.2																										
6	8 42 39.12	1.9276	15 26 6.5	9.934																									
7	8 44 34.69	1.9247	15 16 8.6	9.997																									
8	8 46 30.08	1.9218	15 6 6.9	10.059	<table><tr><td></td><td>d</td><td>h</td></tr><tr><td>☾ Apogee . . . . .</td><td>Dec.</td><td>1 19.8</td></tr><tr><td>☾ Perigee . . . . .</td><td></td><td>14 1.3</td></tr><tr><td>☾ Apogee . . . . .</td><td></td><td>29 6.4</td></tr></table>						d	h	☾ Apogee . . . . .	Dec.	1 19.8	☾ Perigee . . . . .		14 1.3	☾ Apogee . . . . .		29 6.4								
	d	h																											
☾ Apogee . . . . .	Dec.	1 19.8																											
☾ Perigee . . . . .		14 1.3																											
☾ Apogee . . . . .		29 6.4																											
9	8 48 25.30	1.9189	14 56 1.5	10.120																									
10	8 50 20.35	1.9161	14 45 52.5	10.181																									
11	8 52 15.23	1.9132	14 35 39.8	10.241																									
12	8 54 9.93	1.9104	14 25 23.6	10.299																									
13	8 56 4.48	1.9078	14 15 3.9	10.358																									
14	8 57 58.87	1.9051	14 4 40.7	10.416																									
15	8 59 53.09	1.9024	13 54 14.0	10.472																									
16	9 1 47.16	1.8998	13 43 44.0	10.528																									
17	9 3 41.07	1.8972	13 33 10.6	10.584																									
18	9 5 34.83	1.8947	13 22 33.9	10.639																									
19	9 7 28.44	1.8922	13 11 53.9	10.694																									
20	9 9 21.90	1.8898	13 1 10.6	10.747																									
21	9 11 15.22	1.8875	12 50 24.2	10.799																									
22	9 13 8.40	1.8851	12 39 34.7	10.852																									
23	9 15 1.43	1.8828	12 28 42.0	10.903																									
24	9 16 54.33	1.8805	N. 12 17 46.3	10.953																									

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
1	α Arietis W.	69 52 32	3084	71 21 1	3087	72 49 26	3089	74 17 49	3091
	Aldebaran W.	37 33 7	3178	38 59 42	3175	40 26 21	3171	41 53 5	3168
	Regulus E.	42 45 6	3093	41 16 48	3097	39 48 35	3102	38 20 28	3107
	Spica E.	96 42 45	3069	95 13 58	3073	93 45 15	3075	92 16 35	3078
	JUPITER E.	105 5 59	3160	103 39 2	3163	102 12 8	3165	100 45 17	3167
2	α Arietis W.	81 39 12	3097	83 7 25	3098	84 35 37	3097	86 3 50	3097
	Aldebaran W.	49 7 38	3153	50 34 43	3151	52 1 51	3148	53 29 2	3145
	Spica E.	84 53 51	3085	83 25 23	3085	81 56 55	3085	80 28 27	3085
	JUPITER E.	93 31 31	3173	92 4 49	3173	90 38 8	3173	89 11 27	3173
	SUN E.	132 52 34	3476	131 31 43	3476	130 10 52	3476	128 50 1	3475
3	α Arietis W.	93 25 9	3090	94 53 31	3087	96 21 57	3084	97 50 26	3081
	Aldebaran W.	60 45 56	3128	62 13 32	3124	63 41 13	3119	65 8 59	3114
	Pollux W.	19 45 16	3432	21 6 56	3382	22 29 33	3342	23 52 56	3308
	Spica E.	73 5 54	3078	71 37 18	3075	70 8 38	3073	68 39 55	3069
	JUPITER E.	81 57 48	3166	80 30 58	3163	79 4 5	3160	77 37 8	3157
	SUN E.	122 5 25	3466	120 44 23	3463	119 23 17	3459	118 2 7	3454
4	Aldebaran W.	72 29 26	3086	73 57 53	3078	75 26 29	3072	76 55 13	3064
	Pollux W.	30 58 14	3189	32 24 36	3171	33 51 20	3154	35 18 24	3138
	Spica E.	61 15 6	3046	59 45 50	3040	58 16 27	3034	56 46 56	3027
	JUPITER E.	70 21 14	3134	68 53 46	3129	67 26 11	3122	65 58 28	3115
	SUN E.	111 14 57	3428	109 53 12	3421	108 31 19	3414	107 9 18	3406
5	Aldebaran W.	84 21 26	3020	85 51 14	3010	87 21 14	3000	88 51 27	2989
	Pollux W.	42 38 28	3063	44 7 23	3049	45 36 35	3034	47 6 5	3019
	MARS W.	25 31 45	3090	27 0 7	3070	28 28 53	3052	29 58 1	3034
	Spica E.	49 17 6	2987	47 46 37	2978	46 15 57	2968	44 45 4	2958
	JUPITER E.	58 37 44	3077	57 9 6	3068	55 40 17	3059	54 11 17	3049
	SUN E.	100 16 48	3359	98 53 45	3348	97 30 29	3338	96 7 1	3325
6	Pollux W.	54 38 10	2946	56 9 31	2930	57 41 12	2915	59 13 12	2898
	MARS W.	37 29 11	2948	39 0 29	2931	40 32 9	2914	42 4 10	2897
	Spica E.	37 7 22	2902	35 35 6	2891	34 2 36	2879	32 29 50	2867
	JUPITER E.	46 43 12	2997	45 12 56	2985	43 42 26	2975	42 11 42	2963
	SUN E.	89 6 4	3260	87 41 6	3245	86 15 50	3231	84 50 17	3215
7	Pollux W.	66 58 25	2816	68 32 32	2798	70 7 2	2782	71 41 54	2765
	MARS W.	49 49 47	2809	51 24 3	2792	52 58 42	2772	54 33 46	2754
	Regulus W.	29 56 28	2819	31 30 31	2799	33 5 0	2779	34 39 56	2758
	SUN E.	77 37 49	3133	76 10 19	3114	74 42 27	3097	73 14 14	3078
8	Pollux W.	79 42 12	2672	81 19 29	2654	82 57 11	2635	84 35 18	2616
	MARS W.	62 35 16	2660	64 12 50	2640	65 50 51	2621	67 29 18	2601
	Regulus W.	42 41 15	2658	44 18 51	2639	45 56 53	2619	47 35 22	2599
	SUN E.	65 47 22	2983	64 16 48	2963	62 45 49	2943	61 14 25	2924
9	Pollux W.	92 52 21	2522	94 33 4	2503	96 14 13	2485	97 55 48	2466
	MARS W.	75 48 19	2502	77 29 29	2482	79 11 7	2462	80 53 13	2443
	Regulus W.	55 54 38	2500	57 35 51	2480	59 17 32	2461	60 59 40	2441
	SUN E.	53 30 59	2821	51 56 59	2801	50 22 33	2781	48 47 40	2760

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
1	<i>α</i> Arietis	W.	75 46 9	3093	77 14 27	3094	78 42 44	3096	80 10 59	3097
	Aldebaran	W.	43 19 52	3165	44 46 43	3162	46 13 38	3159	47 40 36	3156
	Regulus	E.	36 52 27	3111	35 24 31	3116	33 56 41	3121	32 28 57	3125
	Spica	E.	90 47 58	3079	89 19 23	3082	87 50 51	3082	86 22 20	3084
	JUPITER	E.	99 18 28	3169	97 51 42	3170	96 24 57	3172	94 58 14	3172
2	<i>α</i> Arietis	W.	87 32 3	3096	89 0 17	3096	90 28 32	3094	91 56 49	3091
	Aldebaran	W.	54 56 17	3143	56 23 35	3138	57 50 58	3135	59 18 25	3132
	Spica	E.	78 59 59	3084	77 31 30	3083	76 3 0	3082	74 34 28	3080
	JUPITER	E.	87 44 46	3173	86 18 4	3171	84 51 20	3170	83 24 35	3168
	SUN	E.	127 29 9	3474	126 8 16	3472	124 47 21	3471	123 26 24	3469
3	<i>α</i> Arietis	W.	99 18 59	3078	100 47 36	3073	102 16 19	3069	103 45 7	3063
	Aldebaran	W.	66 36 51	3110	68 4 49	3104	69 32 54	3098	71 1 6	3091
	Pollux	W.	25 16 58	3279	26 41 34	3253	28 6 41	3230	29 32 15	3209
	Spica	E.	67 11 7	3065	65 42 15	3061	64 13 18	3056	62 44 15	3052
	JUPITER	E.	76 10 7	3153	74 43 1	3149	73 15 51	3144	71 48 35	3140
	SUN	E.	116 40 52	3450	115 19 32	3446	113 58 7	3439	112 36 35	3434
4	Aldebaran	W.	78 24 7	3056	79 53 11	3047	81 22 25	3039	82 51 50	3030
	Pollux	W.	36 45 48	3122	38 13 31	3107	39 41 32	3092	41 9 51	3078
	Spica	E.	55 17 17	3020	53 47 29	3012	52 17 31	3005	50 47 24	2996
	JUPITER	E.	64 30 37	3108	63 2 37	3101	61 34 29	3093	60 6 11	3086
	SUN	E.	105 47 8	3397	104 24 48	3389	103 2 19	3379	101 39 39	3370
5	Aldebaran	W.	90 21 54	2977	91 52 35	2966	93 23 30	2954	94 54 40	2942
	Pollux	W.	48 35 54	3005	50 6 0	2990	51 36 25	2976	53 7 8	2961
	MARS	W.	31 27 32	3016	32 57 25	2999	34 27 39	2982	35 58 14	2965
	Spica	E.	43 13 59	2948	41 42 41	2937	40 11 9	2926	38 39 23	2914
	JUPITER	E.	52 42 5	3039	51 12 41	3029	49 43 4	3019	48 13 15	3008
	SUN	E.	94 43 19	3313	93 19 23	3300	91 55 12	3288	90 30 46	3274
6	Pollux	W.	60 45 33	2883	62 18 14	2866	63 51 16	2849	65 24 40	2833
	MARS	W.	43 36 33	2880	45 9 18	2862	46 42 25	2845	48 15 55	2828
	Spica	E.	30 56 49	2855	29 23 32	2842	27 49 59	2830	26 16 10	2818
	JUPITER	E.	40 40 43	2953	39 9 31	2941	37 38 4	2930	36 6 23	2920
	SUN	E.	83 24 26	3199	81 58 16	3183	80 31 47	3167	79 4 58	3150
7	Pollux	W.	73 17 10	2745	74 52 50	2728	76 28 53	2710	78 5 20	2691
	MARS	W.	56 9 14	2735	57 45 7	2717	59 21 24	2698	60 58 7	2678
	Regulus	W.	36 15 19	2738	37 51 8	2718	39 27 24	2698	41 4 6	2678
	SUN	E.	71 45 38	3060	70 16 39	3041	68 47 17	3022	67 17 31	3003
8	Pollux	W.	86 13 51	2597	87 52 50	2579	89 32 14	2560	91 12 4	2540
	MARS	W.	69 8 12	2581	70 47 33	2561	72 27 21	2542	74 7 36	2522
	Regulus	W.	49 14 19	2579	50 53 43	2559	52 33 34	2540	54 13 52	2520
	SUN	E.	59 42 36	2903	58 10 21	2883	56 37 40	2862	55 4 33	2842
9	Pollux	W.	99 37 49	2448	101 20 16	2430	103 3 8	2412	104 46 26	2394
	MARS	W.	82 35 46	2424	84 18 47	2405	86 2 15	2386	87 46 10	2367
	Regulus	W.	62 42 16	2422	64 25 19	2403	66 8 50	2384	67 52 48	2365
	SUN	E.	47 12 20	2741	45 36 34	2720	44 0 21	2701	42 23 42	2681

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
10	MARS W.	89 30 32	2348	91 15 21	2330	93 0 37	2312	94 46 19	2294
	Regulus W.	69 37 13	2346	71 22 5	2328	73 7 23	2311	74 53 7	2293
	SUN E.	40 46 37	2662	39 9 6	2643	37 31 9	2624	35 52 46	2605
11	Regulus W.	83 48 8	2210	85 36 21	2195	87 24 56	2180	89 13 54	2166
	Spica W.	29 46 3	2221	31 33 59	2203	33 22 22	2186	35 11 10	2170
	SUN E.	27 34 45	2380	25 54 0	2304	24 12 53	2490	22 31 26	2477
14	SUN W.	14 11 39	2326	15 57 1	2324	17 42 25	2324	19 27 50	2324
	Fomalhaut E.	58 11 24	2652	56 33 40	2683	54 56 37	2716	53 20 19	2754
	α Pegasi E.	76 13 28	2151	74 23 46	2154	72 34 9	2159	70 44 39	2165
15	SUN W.	28 14 24	2340	29 59 25	2346	31 44 17	2354	33 28 58	2362
	α Pegasi E.	61 40 1	2213	59 51 53	2227	58 4 5	2241	56 16 39	2258
	α Arietis E.	104 0 26	2050	102 8 10	2056	100 16 3	2063	98 24 7	2071
16	SUN W.	42 9 15	2411	43 52 34	2421	45 35 37	2435	47 18 22	2447
	α Pegasi E.	47 26 27	2368	45 42 6	2396	43 58 26	2428	42 15 31	2462
	α Arietis E.	89 7 42	2118	87 17 10	2129	85 26 55	2141	83 36 58	2153
17	SUN W.	55 47 30	2517	57 28 20	2522	59 8 49	2547	60 48 57	2562
	α Arietis E.	74 31 57	2219	72 43 58	2233	70 56 20	2248	69 9 4	2264
	Aldebaran E.	107 17 12	2247	105 29 54	2260	103 42 56	2273	101 56 17	2287
18	SUN W.	69 4 12	2643	70 42 9	2660	72 19 43	2676	73 56 55	2692
	α Aquilæ W.	41 37 59	3666	42 55 22	3596	44 14 1	3534	45 33 48	3479
	α Arietis E.	60 18 24	2342	58 33 26	2358	56 48 51	2375	55 4 40	2391
	Aldebaran E.	93 8 18	2361	91 23 47	2376	89 39 38	2391	87 55 51	2407
19	SUN W.	81 57 23	2775	83 32 23	2792	85 7 1	2808	86 41 18	2825
	α Aquilæ W.	52 25 28	3302	53 49 37	3280	55 14 12	3262	56 39 8	3247
	α Arietis E.	46 29 43	2477	44 47 57	2494	43 6 35	2512	41 25 38	2530
	Aldebaran E.	79 22 31	2486	77 40 58	2502	75 59 48	2517	74 18 59	2534
20	SUN W.	94 27 28	2905	95 59 41	2920	97 31 35	2935	99 3 9	2950
	α Aquilæ W.	63 47 20	3205	65 13 23	3202	66 39 30	3201	68 5 38	3201
	Fomalhaut W.	40 3 23	3787	41 18 39	3722	42 35 3	3665	43 52 27	3616
	Aldebaran E.	66 0 27	2613	64 21 50	2629	62 43 34	2644	61 5 39	2660
	Pollux E.	107 48 50	2604	106 10 1	2618	104 31 30	2632	102 53 18	2645
21	SUN W.	106 36 22	3022	108 6 7	3035	109 35 36	3049	111 4 48	3062
	α Aquilæ W.	75 15 56	3214	76 41 48	3220	78 7 33	3226	79 33 11	3233
	Fomalhaut W.	50 30 48	3449	51 52 9	3428	53 13 54	3409	54 36 0	3393
	Aldebaran E.	53 1 23	2739	51 25 35	2755	49 50 8	2770	48 15 1	2787
	Pollux E.	94 46 44	2710	93 10 17	2722	91 34 6	2734	89 58 11	2747
22	α Aquilæ W.	86 39 11	3274	88 3 53	3284	89 28 23	3294	90 52 42	3305
	Fomalhaut W.	61 30 17	3343	62 53 39	3337	64 17 8	3332	65 40 42	3330
	α Pegasi W.	39 0 14	3116	40 28 4	3103	41 56 10	3094	43 24 27	3087
	Aldebaran E.	40 24 51	2872	38 51 56	2891	37 19 25	2909	35 47 18	2929
	Pollux E.	82 2 35	2805	80 28 13	2815	78 54 5	2827	77 20 12	2837
	MARS E.	97 56 1	2726	96 19 56	2736	94 44 4	2746	93 8 25	2756

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
10	MARS W.	96 32 27	2277	98 19 0	2260	100 5 59	2243	101 53 22	2227
	Regulus W.	76 39 17	2276	78 25 52	2258	80 12 53	2242	82 0 18	2225
	SUN E.	34 13 58	2588	32 34 46	2569	30 55 9	2552	29 15 8	2536
11	Regulus W.	91 3 13	2152	92 52 53	2139	94 42 52	2126	96 33 11	2115
	Spica W.	37 0 22	2155	38 49 57	2141	40 39 54	2127	42 30 12	2115
	SUN E.	20 49 40	2464	19 7 36	2453	17 25 16	2442	15 42 41	2432
14	SUN W.	21 13 15	2324	22 58 39	2327	24 43 59	2330	26 29 15	2335
	Fomalhaut E.	51 44 51	2798	50 10 20	2847	48 36 53	2901	47 4 36	2962
	α Pegasi E.	68 55 18	2172	67 6 8	2180	65 17 10	2190	63 28 27	2201
15	SUN W.	35 13 28	2370	36 57 46	2380	38 41 50	2389	40 25 40	2400
	α Pegasi E.	54 29 38	2277	52 43 4	2296	50 56 59	2318	49 11 26	2342
	α Arietis E.	96 32 23	2079	94 40 52	2088	92 49 34	2097	90 58 30	2107
16	SUN W.	49 0 50	2460	50 42 59	2474	52 24 49	2487	54 6 20	2502
	α Pegasi E.	40 33 24	2499	38 52 10	2542	37 11 55	2588	35 32 44	2640
	α Arietis E.	81 47 19	2165	79 57 59	2178	78 8 58	2191	76 20 17	2205
17	SUN W.	62 28 44	2578	64 8 9	2594	65 47 12	2610	67 25 53	2626
	α Arietis E.	67 22 11	2579	65 35 40	2594	63 49 31	2610	62 3 46	2626
	Aldebaran E.	100 9 59	2302	98 24 2	2316	96 38 26	2331	94 53 11	2346
18	SUN W.	75 33 45	2709	77 10 13	2726	78 46 18	2743	80 22 1	2759
	α Aquilæ W.	46 54 36	3432	48 16 16	3392	49 38 42	3357	51 1 48	3327
	α Arietis E.	53 20 52	2408	51 37 28	2425	49 54 29	2442	48 11 54	2459
	Aldebaran E.	86 12 26	2423	84 29 24	2438	82 46 44	2454	81 4 26	2470
19	SUN W.	88 15 13	2841	89 48 48	2857	91 22 2	2873	92 54 55	2889
	α Aquilæ W.	58 4 22	3234	59 29 51	3224	60 55 32	3216	62 21 22	3209
	α Arietis E.	39 45 6	2548	38 5 0	2566	36 25 19	2585	34 46 4	2604
	Aldebaran E.	72 38 33	2550	70 58 29	2565	69 18 46	2582	67 39 26	2597
20	SUN W.	100 34 24	2965	102 5 21	2980	103 35 59	2994	105 6 19	3008
	α Aquilæ W.	69 31 46	3202	70 57 53	3204	72 23 58	3207	73 49 59	3210
	Fomalhaut W.	45 10 44	3573	46 29 48	3535	47 49 33	3503	49 9 54	3473
	Aldebaran E.	59 28 6	2675	57 50 53	2692	56 14 2	2707	54 37 32	2723
	Pollux E.	101 15 24	2658	99 37 48	2671	98 0 29	2684	96 23 28	2697
21	SUN W.	112 33 44	3075	114 2 24	3087	115 30 49	3101	116 58 58	3112
	α Aquilæ W.	80 58 41	3241	82 24 2	3247	83 49 15	3256	85 14 18	3265
	Fomalhaut W.	55 58 24	3379	57 21 4	3367	58 43 58	3358	60 7 3	3350
	Aldebaran E.	46 40 16	2803	45 5 52	2819	43 31 49	2837	41 58 9	2854
	Pollux E.	88 22 33	2759	86 47 11	2770	85 12 4	2782	83 37 12	2793
22	α Aquilæ W.	92 16 48	3316	93 40 41	3327	95 4 21	3339	96 27 47	3351
	Fomalhaut W.	67 4 19	3327	68 27 59	3325	69 51 41	3325	71 15 24	3325
	α Pegasi W.	44 52 52	3082	46 21 24	3077	47 50 2	3073	49 18 44	3071
	Aldebaran E.	34 15 36	2950	32 44 21	2973	31 13 35	2998	29 43 20	3026
	Pollux E.	75 46 32	2848	74 13 6	2858	72 39 53	2868	71 6 53	2879
	MARS E.	91 32 59	2765	89 57 45	2773	88 22 42	2782	86 47 51	2792

## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.		Noon.	P. L. of Diff.	IIIh.	P. L. of Diff.	VIh.	P. L. of Diff.	IXh.	P. L. of Diff.
			° ' "		° ' "		° ' "		° ' "	
23	Fomalhaut	W.	72 39 7	3325	74 2 49	3326	75 26 30	3329	76 50 8	3331
	α Pegasi	W.	50 47 29	3069	52 16 16	3069	53 45 3	3069	55 13 50	3069
	Pollux	E.	69 34 7	2888	68 1 33	2898	66 29 12	2908	64 57 3	2918
	MARS	E.	85 13 12	2800	83 38 44	2808	82 4 26	2816	80 30 19	2824
	Regulus	E.	106 25 31	2855	104 52 15	2865	103 19 11	2873	101 46 17	2881
24	Fomalhaut	W.	83 47 27	3351	85 10 40	3355	86 33 48	3361	87 56 49	3367
	α Pegasi	W.	62 37 24	3079	64 5 59	3082	65 34 31	3084	67 3 0	3087
	Pollux	E.	57 19 22	2965	55 48 25	2974	54 17 40	2984	52 47 7	2993
	MARS	E.	72 42 14	2861	71 9 5	2869	69 36 6	2875	68 3 15	2882
	Regulus	E.	94 4 21	2920	92 32 27	2926	91 0 41	2933	89 29 4	2940
25	Fomalhaut	W.	94 50 3	3402	96 12 17	3411	97 34 21	3419	98 56 16	3429
	α Pegasi	W.	74 24 24	3105	75 52 28	3109	77 20 27	3113	78 48 21	3116
	α Arietis	W.	30 54 10	3025	32 23 52	3026	33 53 33	3026	35 23 13	3027
	Pollux	E.	45 17 17	3042	43 47 56	3052	42 18 48	3063	40 49 53	3075
	MARS	E.	60 21 9	2914	58 49 8	2920	57 17 15	2927	55 45 30	2933
	Regulus	E.	81 53 4	2971	80 22 15	2977	78 51 34	2983	77 21 0	2989
26	α Pegasi	W.	86 6 41	3137	87 34 6	3141	89 1 26	3145	90 28 41	3149
	α Arietis	W.	42 51 3	3038	44 20 29	3041	45 49 51	3043	47 19 11	3046
	Pollux	E.	33 29 5	3143	32 1 47	3159	30 34 49	3178	29 8 14	3199
	MARS	E.	48 8 42	2964	46 37 44	2970	45 6 54	2977	43 36 12	2984
	Regulus	E.	69 49 51	3015	68 19 57	3019	66 50 8	3024	65 20 25	3029
27	α Arietis	W.	54 45 0	3058	56 14 1	3061	57 42 58	3063	59 11 53	3066
	Aldebaran	W.	22 58 59	3318	24 22 50	3291	25 47 12	3268	27 12 1	3249
	MARS	E.	36 4 55	3022	34 35 9	3030	33 5 34	3041	31 36 12	3052
	Regulus	E.	57 53 15	3051	56 24 5	3055	54 55 0	3059	53 26 0	3063
28	α Arietis	W.	66 35 41	3077	68 4 19	3078	69 32 55	3081	71 1 28	3082
	Aldebaran	W.	34 20 38	3191	35 46 58	3183	37 13 27	3178	38 40 3	3172
	Regulus	E.	46 2 12	3082	44 33 40	3086	43 5 13	3090	41 36 51	3093
	Spica	E.	100 0 43	3061	98 31 46	3065	97 2 53	3066	95 34 2	3069
29	α Arietis	W.	78 23 50	3088	79 52 14	3089	81 20 37	3090	82 48 59	3090
	Aldebaran	W.	45 54 27	3153	47 21 33	3150	48 48 42	3148	50 15 54	3144
	Regulus	E.	34 16 10	3114	32 48 17	3119	31 20 30	3124	29 52 49	3129
	Spica	E.	88 10 20	3076	86 41 41	3077	85 13 3	3078	83 44 26	3078
	JUPITER	E.	101 25 44	3148	99 58 33	3149	98 31 23	3150	97 4 14	3150
30	α Arietis	W.	90 10 46	3090	91 39 8	3089	93 7 31	3088	94 35 55	3087
	Aldebaran	W.	57 32 42	3133	59 0 12	3129	60 27 46	3127	61 55 23	3124
	Spica	E.	76 21 26	3078	74 52 50	3078	73 24 13	3077	71 55 35	3076
	JUPITER	E.	89 48 30	3149	88 21 20	3148	86 54 9	3148	85 26 57	3147
31	α Arietis	W.	101 58 19	3078	103 26 55	3076	104 55 34	3073	106 24 17	3069
	Aldebaran	W.	69 14 20	3109	70 42 19	3105	72 10 23	3101	73 38 31	3097
	Pollux	W.	27 49 44	3245	29 15 0	3226	30 40 38	3209	32 6 37	3192
	Spica	E.	64 32 1	3067	63 3 11	3055	61 34 18	3061	60 5 21	3059
	JUPITER	E.	78 10 30	3137	76 43 5	3134	75 15 37	3132	73 48 6	3129
	VENUS	E.	105 57 35	3229	104 32 0	3226	103 6 22	3225	101 40 42	3222



## GREENWICH MEAN TIME.

## LUNAR DISTANCES.

Day of the Month.	Name and Direction of Object.	Midnight.	P. L. of Diff.	XVh.	P. L. of Diff.	XVIIIh.	P. L. of Diff.	XXIh.	P. L. of Diff.
		° ' "		° ' "		° ' "		° ' "	
23	Fomalhaut W.	78 13 44	3333	79 37 17	3338	81 0 45	3342	82 24 8	3345
	α Pegasi W.	56 42 37	3071	58 11 22	3073	59 40 5	3074	61 8 46	3077
	Pollux E.	63 25 7	2927	61 53 23	2937	60 21 51	2946	58 50 31	2955
	MARS E.	78 56 22	2832	77 22 36	2839	75 48 59	2847	74 15 32	2854
	Regulus E.	100 13 34	2889	98 41 1	2897	97 8 38	2905	95 36 25	2912
24	Fomalhaut W.	89 19 43	3373	90 42 30	3380	92 5 9	3387	93 27 40	3394
	α Pegasi W.	68 31 25	3091	69 59 46	3094	71 28 3	3097	72 56 16	3101
	Pollux E.	51 16 45	3002	49 46 35	3012	48 16 37	3022	46 46 51	3031
	MARS E.	66 30 33	2889	64 58 0	2895	63 25 35	2901	61 53 18	2908
	Regulus E.	87 57 36	2946	86 26 16	2953	84 55 4	2959	83 24 0	2965
25	Fomalhaut W.	100 18 0	3438	101 39 33	3448	103 0 55	3459	104 22 5	3470
	α Pegasi W.	80 16 11	3120	81 43 56	3124	83 11 36	3129	84 39 11	3133
	α Arietis W.	36 52 52	3029	38 22 29	3031	39 52 3	3034	41 21 34	3035
	Pollux E.	39 21 13	3087	37 52 47	3099	36 24 36	3113	34 56 42	3127
	MARS E.	54 13 53	2939	52 42 24	2945	51 11 2	2951	49 39 48	2958
	Regulus E.	75 50 33	2994	74 20 13	2999	72 49 59	3005	71 19 52	3009
26	α Pegasi W.	91 55 51	3153	93 22 56	3158	94 49 55	3163	96 16 49	3168
	α Arietis W.	48 48 27	3048	50 17 40	3051	51 46 50	3053	53 15 57	3056
	Pollux E.	27 42 4	3223	26 16 22	3231	24 51 13	3232	23 26 40	3239
	MARS E.	42 5 39	2990	40 35 14	2997	39 4 58	3005	37 34 51	3014
	Regulus E.	63 50 48	3034	62 21 17	3038	60 51 51	3042	59 22 30	3047
27	α Arietis W.	60 40 44	3069	62 9 32	3070	63 38 18	3073	65 7 1	3075
	Aldebaran W.	28 37 12	3233	30 2 42	3220	31 28 28	3209	32 54 27	3198
	MARS E.	30 7 3	3064	28 38 9	3078	27 9 32	3092	25 41 13	3110
	Regulus E.	51 57 5	3067	50 28 15	3070	48 59 29	3074	47 30 48	3078
28	α Arietis W.	72 30 0	3083	73 58 30	3085	75 26 58	3086	76 55 25	3087
	Aldebaran W.	40 6 46	3168	41 33 34	3163	43 0 27	3159	44 27 25	3156
	Regulus E.	40 8 33	3097	38 40 20	3101	37 12 12	3105	35 44 8	3110
	Spica E.	94 5 14	3069	92 36 27	3072	91 7 43	3073	89 39 1	3074
29	α Arietis W.	84 17 21	3091	85 45 42	3091	87 14 3	3091	88 42 24	3090
	Aldebaran W.	51 43 10	3143	53 10 28	3139	54 37 50	3138	56 5 14	3134
	Regulus E.	28 25 14	3135	26 57 47	3142	25 30 28	3150	24 3 19	3159
	Spica E.	82 15 49	3078	80 47 13	3078	79 18 37	3079	77 50 2	3078
	JUPITER E.	95 37 5	3150	94 9 56	3151	92 42 48	3150	91 15 39	3150
30	α Arietis W.	96 4 20	3086	97 32 47	3095	99 1 15	3082	100 29 46	3081
	Aldebaran W.	63 23 3	3121	64 50 47	3119	66 18 34	3115	67 46 25	3112
	Spica E.	70 26 56	3074	68 58 15	3073	67 29 33	3071	66 0 48	3069
	JUPITER E.	83 59 44	3145	82 32 29	3143	81 5 12	3141	79 37 52	3139
31	α Arietis W.	107 53 4	3066	109 21 55	3093	110 50 50	3059	112 19 50	3055
	Aldebaran W.	75 6 44	3092	76 35 3	3088	78 3 27	3083	79 31 57	3078
	Pollux W.	33 32 56	3178	34 59 32	3165	36 26 23	3153	37 53 29	3140
	Spica E.	58 36 21	3055	57 7 16	3052	55 38 7	3047	54 8 53	3043
	JUPITER E.	72 20 31	3125	70 52 52	3121	69 25 8	3118	67 57 20	3113
	VENUS E.	100 14 59	3220	98 49 13	3217	97 23 24	3214	95 57 31	3210

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.						
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.		
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m	
1	19 35 26.01	- 8.605	-20 16 12.7	+29.51	0 50.5	1	19 16 55.11	+12.282	-21 48 24.8	- 1.47	22 31.0	
2	19 31 37.24	10.424	20 5 15.4	25.24	0 42.8	2	19 21 54.30	12.644	21 48 28.4	+ 1.18	22 32.2	
3	19 27 7.72	11.984	19 56 1.6	20.91	0 34.4	3	19 27 1.78	12.974	21 47 27.3	3.92	22 33.5	
4	19 22 4.71	13.204	19 48 31.6	16.62	0 25.5	4	19 32 16.80	13.274	21 45 19.6	6.73	22 35.0	
5	19 16 37.18	14.017	19 42 43.2	12.45	0 16.1	5	19 37 38.73	13.549	21 42 3.6	9.61	22 36.5	
6	19 10 55.44	-14.383	-19 38 32.9	+ 8.45	0 8.5	6	19 43 6.96	+13.800	-21 37 37.8	+12.33	22 38.1	
7	19 5 10.41	14.294	19 35 56.3	4.64	23 47.4	7	19 48 40.94	14.028	21 32 0.9	15.54	22 39.8	
8	18 59 32.77	13.772	19 34 48.9	+ 1.01	23 38.2	8	19 54 20.18	14.238	21 25 11.5	18.58	22 41.6	
9	18 54 12.41	12.866	19 35 6.2	- 2.42	23 29.4	9	20 0 4.25	14.432	21 17 8.7	21.65	22 43.4	
10	18 49 17.70	11.648	19 36 43.6	5.66	23 21.1	10	20 5 52.77	14.609	21 7 51.8	24.76	22 45.4	
11	18 44 55.20	-10.194	-19 39 36.0	- 8.68	23 13.4	11	20 11 45.36	+14.771	-20 57 19.8	+27.91	22 47.4	
12	18 41 9.64	8.583	19 43 38.0	11.45	23 6.4	12	20 17 41.66	14.920	20 45 31.9	31.08	22 49.4	
13	18 38 3.85	6.891	19 48 43.1	13.93	23 0.0	13	20 23 41.41	15.058	20 32 27.5	34.28	22 51.5	
14	18 35 39.09	5.174	19 54 44.2	16.10	22 54.3	14	20 29 44.34	15.185	20 18 6.1	37.50	22 53.7	
15	18 33 55.32	3.422	20 1 33.0	17.91	22 49.3	15	20 35 50.20	15.302	20 2 27.3	40.74	22 55.9	
16	18 32 51.50	- 1.849	-20 9 0.9	-19.35	22 44.8	16	20 41 58.76	+15.411	-19 45 30.5	+43.99	22 58.1	
17	18 32 25.91	- 0.299	20 16 58.8	20.41	22 41.1	17	20 48 9.85	15.512	19 27 15.5	47.26	23 0.4	
18	18 32 36.38	+ 1.154	20 25 17.6	21.09	22 37.8	18	20 54 23.27	15.666	19 7 42.0	50.53	23 2.7	
19	18 33 20.45	2.502	20 33 48.1	21.40	22 35.2	19	21 0 38.87	15.694	18 46 49.8	53.82	23 5.1	
20	18 34 35.61	3.744	20 42 21.8	21.35	22 33.0	20	21 6 56.55	15.778	18 24 38.6	57.12	23 7.5	
21	18 36 19.36	+ 4.883	-20 50 50.4	-20.97	22 31.2	21	21 13 16.16	+15.856	-18 1 8.2	+60.42	23 9.9	
22	18 38 29.20	5.922	20 59 6.1	20.28	22 29.8	22	21 19 37.60	15.931	17 36 18.6	63.72	23 12.3	
23	18 41 2.87	6.868	21 7 1.7	19.30	22 28.7	23	21 26 0.82	16.003	17 10 9.7	67.03	23 14.8	
24	18 43 58.20	7.728	21 14 30.7	18.07	22 28.0	24	21 32 25.73	16.072	16 42 41.3	70.34	23 17.3	
25	18 47 13.19	8.509	21 21 27.3	16.60	22 27.6	25	21 38 52.29	16.140	16 13 53.4	73.65	23 19.8	
26	18 50 46.04	+ 9.217	-21 27 45.9	-14.92	22 27.4	26	21 45 20.47	+16.207	-15 43 46.0	+76.96	23 22.4	
27	18 54 35.06	9.859	21 33 21.9	13.05	22 27.4	27	21 51 50.23	16.273	15 12 19.3	80.26	23 25.0	
28	18 58 38.77	10.441	21 38 10.7	11.00	22 27.9	28	21 58 21.58	16.340	14 39 33.3	83.57	23 27.6	
29	19 2 55.80	10.969	21 42 8.7	8.81	29 28.4	29	22 4 54.53	16.407	14 5 27.9	86.88	23 30.2	
30	19 7 24.91	11.449	21 45 12.3	6.48	22 29.1	30	22 11 29.08	16.474	13 30 3.3	90.17	23 32.9	
31	19 12 5.02	+11.886	-21 47 18.6	- 4.03	22 30.0	31	22 18 5.28	+16.543	-12 53 19.9	+93.45	23 35.6	
32	19 16 55.11	+12.282	-21 48 24.8	- 1.47	22 31.0	32	22 24 43.15	+16.613	-12 15 17.9	+96.72	23 38.3	
Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	Day of the Month.	5th.	10th.	15th.	20th.	25th.
Semidiameter .	4.6	5.0	4.8	4.4	3.9	3.5	Semidiameter .	3.0	2.8	2.7	2.6	2.5
Hor. Parallax .	12.2	13.2	12.8	11.6	10.4	9.4	Hor. Parallax .	8.0	7.5	7.2	6.9	6.7

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

## MARCH.

## APRIL.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
h m s	h m s	"	"	"	h m	h m s	h m s	"	"	"	h m
1	22 4 54.53	+16.407	-14 5 27.9	+86.88	23 30.2	1	1 39 5.84	+16.008	+11 37 50.7	+122.27	0 59.7
2	22 11 29.08	16.474	13 30 3.3	90.17	23 32.9	2	1 45 24.38	15.527	12 25 45.7	117.23	1 2.1
3	22 18 5.28	16.543	12 53 19.9	93.45	23 35.6	3	1 51 30.70	14.991	13 11 34.2	111.74	1 4.2
4	22 24 43.15	16.613	12 15 17.9	96.74	23 38.3	4	1 57 23.50	14.400	13 55 5.7	105.83	1 6.2
5	22 31 22.74	16.686	11 35 57.4	99.98	23 41.1	5	2 3 1.51	13.759	14 36 11.0	99.56	1 7.9
6	22 38 4.11	+16.762	-10 55 19.1	+103.21	23 43.9	6	2 8 23.53	+13.069	+15 14 42.1	+92.99	1 9.3
7	22 44 47.32	16.840	10 13 23.6	106.41	23 46.7	7	2 13 28.45	12.334	15 50 32.3	86.16	1 10.4
8	22 51 32.44	16.921	9 30 11.6	109.58	23 49.5	8	2 18 15.24	11.558	16 23 35.9	79.11	1 11.3
9	22 58 19.53	17.004	8 45 43.8	112.72	23 52.4	9	2 22 42.94	10.744	16 53 48.3	71.90	1 11.7
10	23 5 8.64	17.089	8 0 1.5	115.80	23 55.3	10	2 26 50.70	9.898	17 21 5.8	64.54	1 11.9
11	23 11 59.83	+17.177	-7 13 5.9	+118.82	23 58.3	11	2 30 37.77	+19.020	+17 45 25.4	+57.08	1 11.7
12	23 18 53.16	17.267	6 24 58.7	121.77		12	2 34 3.45	8.116	18 6 44.8	49.52	1 11.2
13	23 25 48.67	17.358	5 35 41.8	124.62	0 1.3	13	2 37 7.17	7.190	18 25 1.8	41.89	1 10.3
14	23 32 46.35	17.449	4 45 17.6	127.37	0 4.3	14	2 39 48.44	6.246	18 40 15.1	34.21	1 9.0
15	23 39 46.20	17.539	3 53 49.0	129.99	0 7.3	15	2 42 6.90	5.290	18 52 23.7	26.49	1 7.4
16	23 46 48.19	+17.626	-3 1 19.3	+132.45	0 10.4	16	2 44 2.30	+4.327	+19 1 26.5	+18.74	1 5.3
17	23 53 52.24	17.709	2 7 52.7	134.73	0 13.6	17	2 45 34.57	3.363	19 7 23.1	10.98	1 2.9
18	0 0 58.19	17.785	1 13 33.9	136.80	0 16.7	18	2 46 43.75	2.404	19 10 13.9	+3.25	1 0.1
19	0 8 5.85	17.852	0 18 28.2	138.62	0 19.9	19	2 47 30.08	1.460	19 9 59.7	-4.43	0 56.9
20	0 15 14.97	17.906	+0 37 17.7	140.15	0 23.2	20	2 47 54.00	+0.538	19 6 42.0	12.03	0 53.4
21	0 22 25.19	+17.943	+1 33 36.3	+141.35	0 26.4	21	2 47 56.16	-0.352	+19 0 23.5	-19.49	0 49.5
22	0 29 36.07	17.960	2 30 19.4	142.18	0 29.6	22	2 47 37.43	1.200	18 51 7.9	26.77	0 45.2
23	0 36 47.05	17.951	3 27 17.6	142.59	0 32.9	23	2 46 58.96	1.996	18 39 0.7	33.78	0 40.6
24	0 43 57.49	17.913	4 24 20.2	142.55	0 36.1	24	2 46 2.13	2.789	18 24 9.2	40.45	0 35.8
25	0 51 6.61	17.840	5 21 15.8	142.00	0 39.3	25	2 44 48.56	3.384	18 6 42.5	46.70	0 30.6
26	0 58 13.52	+17.728	+6 17 51.7	+140.91	0 42.5	26	2 43 20.10	-3.967	+17 46 51.8	-52.43	0 25.2
27	1 5 17.22	17.572	7 13 54.9	139.26	0 45.6	27	2 41 38.86	4.453	17 24 50.9	57.53	0 19.6
28	1 12 16.61	17.368	8 9 11.6	137.03	0 48.7	28	2 39 47.12	4.842	17 0 55.8	61.94	0 13.8
29	1 19 10.46	17.111	9 3 27.5	134.20	0 51.6	29	2 37 47.29	5.127	16 35 24.1	65.57	0 7.9
30	1 25 57.51	16.800	9 56 28.6	130.79	0 54.4	30	2 35 41.88	5.306	16 8 35.5	68.32	0 1.9
31	1 32 36.43	+16.433	+10 48 0.8	+126.80	0 57.1	31	2 33 33.45	-5.378	+15 40 51.8	-70.17	23 49.8
32	1 39 5.84	+16.008	+11 37 50.7	+122.27	0 59.7	32	2 31 24.54	-5.346	+15 12 34.9	-71.08	23 43.8

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter . . .	2.5	2.5	2.5	2.5	2.6	2.7	Semidiameter . . .	3.0	3.4	3.9	4.5	5.1	5.6
Hor. Parallax . . .	6.6	6.5	6.5	6.6	6.8	7.2	Hor. Parallax . . .	7.9	8.9	10.2	11.8	13.5	14.9

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

GREENWICH MEAN TIME.														
MAY.						JUNE.								
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.			
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.				
1	h m s	s	° ' "	"	h m	1	h m s	s	° ' "	"	h m			
1	2 33 33.45	- 5.378	+15 40 51.8	-70.17	23 49.8	1	3 1 22.29	+11.211	+13 43 52.5	+61.26	22 22.0			
2	2 31 24.54	5.346	15 12 34.9	71.08	23 43.8	2	3 5 57.59	11.731	14 8 54.2	63.85	22 22.8			
3	2 29 17.64	5.212	14 44 7.4	71.05	23 37.8	3	3 10 45.39	12.253	14 34 55.2	66.20	22 23.9			
4	2 27 15.11	4.983	14 15 52.1	70.07	23 31.9	4	3 15 45.74	12.777	15 1 49.7	68.29	22 25.2			
5	2 25 19.16	4.666	13 48 11.2	68.19	23 26.2	5	3 20 58.69	13.304	15 29 31.2	70.12	22 26.6			
6	2 23 31.76	- 4.272	+13 21 25.4	-65.49	23 20.6	6	3 26 24.34	+13.835	+15 57 53.4	+71.69	22 28.3			
7	2 21 54.68	3.808	12 55 53.8	62.02	23 15.3	7	3 32 2.82	14.372	16 26 50.1	72.98	22 30.2			
8	2 20 29.46	3.285	12 31 53.6	57.89	23 10.2	8	3 37 54.26	14.916	16 56 14.2	73.98	22 32.3			
9	2 19 17.38	2.715	12 9 39.8	53.18	23 5.3	9	3 43 58.84	15.466	17 25 58.6	74.67	22 34.6			
10	2 18 19.46	2.106	11 49 24.9	48.00	23 0.6	10	3 50 16.71	16.024	17 55 55.7	75.04	22 37.2			
11	2 17 36.51	- 1.469	+11 31 18.9	-42.45	22 56.2	11	3 56 48.06	+16.589	+18 25 57.8	+75.07	22 40.1			
12	2 17 9.12	0.811	11 15 29.7	36.66	22 52.1	12	4 3 33.03	17.159	18 55 56.3	74.74	22 43.2			
13	2 16 57.69	- 0.140	11 2 2.7	30.60	22 48.2	13	4 10 31.75	17.735	19 25 42.5	74.04	22 46.4			
14	2 17 2.46	+ 0.538	10 51 1.7	24.47	22 44.6	14	4 17 44.31	18.313	19 55 7.0	72.93	22 49.9			
15	2 17 23.53	1.217	10 42 28.6	18.30	22 41.3	15	4 25 10.76	18.892	20 23 59.7	71.39	22 53.6			
16	2 18 0.85	+ 1.892	+10 36 23.3	-12.16	22 38.2	16	4 32 51.08	+19.468	+20 52 10.1	+69.40	22 57.5			
17	2 18 54.27	2.559	10 32 44.6	6.08	22 35.4	17	4 40 45.14	20.036	21 19 27.1	66.94	23 1.7			
18	2 20 3.60	3.217	10 31 30.5	- 0.12	22 32.9	18	4 48 52.70	20.592	21 45 39.2	63.99	23 6.1			
19	2 21 28.58	3.863	10 32 37.7	+ 5.69	22 30.6	19	4 57 13.39	21.189	22 10 34.5	60.54	23 10.8			
20	2 23 8.91	4.496	10 36 2.1	11.32	22 28.6	20	5 5 46.70	21.642	22 34 0.9	56.58	23 15.6			
21	2 25 4.28	+ 5.116	+10 41 39.5	+16.76	22 26.8	21	5 14 31.92	+22.123	+22 55 46.1	+52.11	23 20.6			
22	2 27 14.37	5.722	10 49 24.7	21.98	22 25.3	22	5 23 28.21	22.562	23 15 38.2	47.15	23 25.7			
23	2 29 38.85	6.315	10 59 12.5	26.97	22 24.0	23	5 32 34.51	22.955	23 33 25.7	41.73	23 31.1			
24	2 32 17.38	6.894	11 10 57.5	31.74	22 22.9	24	5 41 49.60	23.293	23 48 57.8	35.88	23 36.5			
25	2 35 9.68	7.462	11 24 34.2	36.28	22 22.0	25	5 51 12.10	23.571	24 2 4.9	29.65	23 42.1			
26	2 38 15.48	+ 8.020	+11 39 56.8	+40.57	22 21.4	26	6 0 40.48	+23.782	+24 12 38.5	+23.10	23 47.7			
27	2 41 34.53	8.567	11 56 59.5	44.62	22 20.9	27	6 10 13.11	23.985	24 20 31.9	16.31	23 53.4			
28	2 45 6.62	9.106	12 15 36.6	48.43	22 20.7	28	6 19 48.32	23.996	24 25 40.2	9.36	23 59.0			
29	2 48 51.57	9.638	12 35 42.1	52.00	22 20.8	29	6 29 24.38	23.996	24 28 0.3	+ 2.31				
30	2 52 49.23	10.166	12 57 10.5	55.33	22 21.0	30	6 38 59.62	23.988	24 27 31.0	- 4.75	0 4.7			
31	2 56 59.49	+10.690	+13 19 56.0	+58.42	22 21.4	31	6 48 32.43	+23.795	+24 24 13.0	-11.74	0 10.3			
32	3 1 22.29	+11.211	+13 43 52.5	+61.26	22 22.0	32	6 58 1.30	+23.600	+24 18 8.7	-18.59	0 15.9			
Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.
Semidiameter .	5.9	5.9	5.7	5.2	4.7	4.3	3.8	Semidiameter .	3.5	3.2	2.9	2.7	2.6	2.5
Hor. Parallax .	15.7	15.7	15.0	13.8	12.5	11.3	10.2	Hor. Parallax .	9.2	8.3	7.6	7.1	6.8	6.7
NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.														

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

## JULY.

## AUGUST.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	" "	"	h m		h m s	s	" "	"	h m
1	6 48 32.43	+23.795	+24 24 13.0	-11.74	0 10.3	1	10 28 6.51	+11.332	+9 15 38.2	-92.50	1 47.7
2	6 58 1.30	23.600	24 18 8.7	18.59	0 15.9	2	10 32 33.84	10.944	8 38 49.2	91.55	1 48.2
3	7 7 24.80	23.350	24 9 22.3	25.24	0 21.4	3	10 36 51.81	10.552	8 2 25.0	90.43	1 48.5
4	7 16 41.70	23.052	23 57 59.0	31.65	0 26.7	4	10 41 0.31	10.155	7 26 29.9	89.13	1 48.7
5	7 25 50.95	22.717	23 44 5.2	37.78	0 31.9	5	10 44 59.18	9.750	6 51 8.3	87.64	1 48.7
6	7 34 51.61	+22.337	+23 27 48.1	-43.58	0 37.0	6	10 48 48.22	+9.335	+6 16 24.8	-85.96	1 48.6
7	7 43 42.91	21.934	23 9 15.8	49.05	0 42.0	7	10 52 27.18	8.910	5 42 23.9	84.08	1 48.3
8	7 52 24.27	21.509	22 48 36.2	54.17	0 46.7	8	10 55 55.81	8.473	5 9 10.5	82.00	1 47.8
9	8 0 55.21	21.067	22 25 58.3	58.94	0 51.3	9	10 59 13.78	8.022	4 36 49.7	79.65	1 47.2
10	8 9 15.40	20.613	22 1 29.9	63.36	0 55.7	10	11 2 20.70	7.554	4 5 27.1	77.15	1 46.3
11	8 17 24.61	+20.152	+21 35 19.9	-67.42	0 59.9	11	11 5 16.21	+7.068	+3 35 8.3	-74.37	1 45.3
12	8 25 22.70	19.688	21 7 36.5	71.14	1 3.9	12	11 7 59.80	6.561	3 5 59.5	71.33	1 44.1
13	8 33 9.62	19.222	20 38 27.6	74.54	1 7.8	13	11 10 30.96	6.032	2 38 7.3	67.98	1 42.7
14	8 40 45.36	18.757	20 8 1.0	77.62	1 11.4	14	11 12 49.15	5.479	2 11 38.6	64.35	1 41.0
15	8 48 10.00	18.296	19 36 24.2	80.40	1 14.9	15	11 14 53.75	4.900	1 46 41.0	60.40	1 39.1
16	8 55 23.62	+17.840	+19 3 44.2	-82.89	1 18.2	16	11 16 44.11	+4.292	+1 23 22.3	-56.09	1 37.0
17	9 2 26.37	17.390	18 30 7.8	85.10	1 21.3	17	11 18 19.54	3.655	1 1 51.6	51.42	1 34.6
18	9 9 18.40	16.947	17 55 41.4	87.05	2 24.2	18	11 19 39.28	2.986	0 42 17.6	46.35	1 32.0
19	9 15 59.87	16.510	17 20 31.3	88.76	1 27.0	19	11 20 42.61	2.286	0 24 50.0	40.88	1 29.1
20	9 22 30.95	16.081	16 44 43.0	90.23	1 29.5	20	11 21 28.77	1.555	+0 9 38.9	34.98	1 25.9
21	9 28 51.82	+15.659	+16 8 22.1	-91.47	1 31.9	21	11 21 57.00	+0.793	-0 3 5.2	-28.62	1 22.4
22	9 35 2.65	15.244	15 31 34.0	92.50	1 34.2	22	11 22 6.60	+0.003	0 13 11.3	21.81	1 18.6
23	9 41 3.58	14.836	14 54 23.6	93.32	1 36.2	23	11 21 56.94	-0.812	0 20 28.3	14.54	1 14.5
24	9 46 54.79	14.433	14 16 56.0	93.95	1 38.1	24	11 21 27.46	1.647	0 24 45.4	-6.82	1 10.1
25	9 52 36.40	14.036	13 39 15.6	94.39	1 39.9	25	11 20 37.77	2.494	0 25 52.4	+1.32	1 5.3
26	9 58 8.54	+13.643	+13 1 26.8	-94.65	1 41.5	26	11 19 27.70	-3.344	-0 23 39.3	+9.83	1 0.2
27	10 3 31.31	13.254	12 23 34.1	94.72	1 42.9	27	11 17 57.32	4.185	0 17 58.2	18.65	0 54.8
28	10 8 44.78	12.868	11 45 41.8	94.62	1 44.1	28	11 16 7.02	5.001	-0 8 42.8	27.67	0 49.0
29	10 13 49.01	12.485	11 7 54.0	94.34	1 45.2	29	11 13 57.61	5.775	+0 4 10.3	36.76	0 42.9
30	10 18 44.05	12.102	10 30 14.8	93.90	1 46.2	30	11 11 30.30	6.488	0 20 40.7	45.75	0 36.5
31	10 23 29.89	+11.718	+9 52 48.1	-93.29	1 47.1	31	11 8 46.85	-7.117	+0 40 44.2	+54.48	0 29.9
32	10 28 6.51	+11.332	+9 15 38.2	-92.50	1 47.7	32	11 5 49.52	-7.640	+1 4 11.9	+62.72	0 23.0

Day of the Month.	5th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
Semidiameter . . .	"	"	"	"	"	"	Semidiameter . . .	"	"	"	"	"	"
Hor. Parallax . . .	2.5	2.6	2.7	2.8	3.0	3.2	Hor. Parallax . . .	3.5	3.8	4.1	4.5	4.9	5.2
	6.7	6.9	7.2	7.5	8.0	8.5		9.2	9.9	10.8	11.8	12.8	13.7

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	11 5 49.52	-7.640	+1 4 11.9	+62.72	0 23.0	1	11 43 52.42	+13.655	+3 49 3.8	-98.48	23 5.2
2	11 2 41.15	8.034	1 30 48.9	70.22	0 16.0	2	11 50 10.08	13.808	3 8 56.8	102.01	23 7.6
3	10 59 25.09	8.277	2 0 14.8	76.75	0 8.8	3	11 56 30.84	15.915	2 27 32.1	104.96	23 10.0
4	10 56 5.20	8.351	2 32 3.2	82.06	0 1.6	4	12 2 53.67	15.982	1 45 2.9	107.38	23 12.5
5	10 52 45.70	8.242	3 5 42.7	85.98	23 47.2	5	12 9 17.72	16.018	1 1 41.5	109.32	23 15.0
6	10 49 31.12	-7.940	+3 40 37.7	+88.32	23 40.2	6	12 15 42.31	+16.028	+0 17 39.0	-110.82	23 17.4
7	10 46 26.14	7.442	4 16 8.5	88.96	23 33.4	7	12 22 6.89	16.018	-0 26 54.5	111.92	23 19.9
8	10 43 35.39	6.755	4 51 34.0	87.88	23 27.0	8	12 28 31.02	15.992	1 11 50.1	112.66	23 22.3
9	10 41 3.30	5.889	5 26 12.9	85.08	23 20.9	9	12 34 54.38	15.954	1 56 59.7	113.09	23 24.8
10	10 38 53.98	4.862	5 59 24.8	80.65	23 15.3	10	12 41 16.73	15.908	2 42 16.3	113.24	23 27.2
11	10 37 11.02	-5.696	+6 30 31.9	+74.70	23 10.1	11	12 47 37.90	+15.856	-3 27 33.3	-113.14	23 29.6
12	10 35 57.49	2.416	6 58 59.9	67.42	23 5.4	12	12 53 57.77	15.801	4 12 45.2	112.82	23 32.0
13	10 35 15.75	-1.050	7 24 19.0	58.99	23 1.3	13	13 0 16.34	15.746	4 57 46.9	112.30	23 34.3
14	10 35 7.52	+0.371	7 46 3.9	49.62	22 57.8	14	13 6 33.58	15.690	5 42 34.1	111.60	23 36.6
15	10 35 33.78	1.821	8 3 54.9	39.52	22 54.9	15	13 12 49.49	15.637	6 27 2.6	110.75	23 38.9
16	10 36 34.91	+3.271	+8 17 36.9	+28.90	22 52.5	16	13 19 4.16	+15.586	-7 11 9.0	-109.76	23 41.2
17	10 38 10.58	4.696	8 26 59.6	17.95	22 50.7	17	13 25 17.65	15.539	7 54 50.1	108.65	23 43.5
18	10 40 19.96	6.076	8 31 57.2	+6.85	22 49.4	18	13 31 30.05	15.495	8 38 3.2	107.42	23 45.7
19	10 43 1.69	7.390	8 32 28.2	-4.22	22 48.6	19	13 37 41.46	15.456	9 20 45.5	106.09	23 48.0
20	10 46 14.02	8.623	8 28 34.9	15.16	22 48.3	20	13 43 52.00	15.423	10 2 54.8	104.67	23 50.2
21	10 49 54.84	+9.762	+8 20 23.1	-25.77	22 48.5	21	13 50 1.79	+15.394	-10 44 29.0	-103.17	23 52.4
22	10 54 1.82	10.801	8 8 1.5	35.95	22 49.1	22	13 56 10.93	15.370	11 25 26.2	101.59	23 54.6
23	10 58 32.46	11.734	7 51 41.7	45.61	22 50.0	23	14 2 19.57	15.352	12 5 44.6	99.93	23 56.8
24	11 3 24.19	12.558	7 31 37.0	54.68	22 51.2	24	14 8 27.84	15.338	12 45 22.5	98.21	23 59.0
25	11 8 34.38	13.274	7 8 2.5	63.08	22 52.7	25	14 14 35.86	15.330	13 24 18.4	96.43	
26	11 14 0.52	+13.888	+6 41 14.8	-70.77	22 54.4	26	14 20 43.74	+15.328	-14 2 30.8	-94.59	0 1.2
27	11 19 40.22	14.404	6 11 31.1	77.74	22 56.3	27	14 26 51.63	15.330	14 39 58.3	92.69	0 3.4
28	11 25 31.21	14.831	5 39 9.0	85.98	22 58.4	28	14 32 59.62	15.337	15 16 39.6	90.74	0 5.6
29	11 31 31.44	15.176	5 4 25.8	89.50	23 0.5	29	14 39 7.82	15.348	15 52 33.3	88.75	0 7.8
30	11 37 39.06	15.448	4 27 38.6	94.32	23 2.8	30	14 45 16.34	15.363	16 27 38.2	86.67	0 10.0
31	11 43 52.42	+15.655	+3 49 3.8	-98.48	23 5.2	31	14 51 25.28	+15.382	-17 1 53.0	-84.55	0 12.2
32	11 50 10.08	+15.808	+3 8 56.8	-102.01	23 7.6	32	14 57 34.73	+15.405	-17 35 16.4	-82.98	0 14.4
Day of the Month.						Day of the Month.					
	8d.	8th.	18th.	18th.	28d.		8d.	8th.	18th.	18th.	28d.
Semidiameter . . .	5.3	5.1	4.5	3.9	3.3	Semidiameter . . .	2.7	2.5	2.4	2.4	2.3
Hor. Parallax . . .	14.0	13.4	12.0	10.3	8.8	Hor. Parallax . . .	7.1	6.7	6.4	6.2	6.2

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	" "	"	h m		h m s	s	" "	"	h m
1	14 57 34.73	+15.405	-17 35 16.4	-82.38	0 14.4	1	18 1 2.54	+12.855	-25 47 33.8	+8.15	1 19.7
2	15 3 44.77	15.432	18 7 47.0	80.16	0 16.6	2	18 6 4.17	12.266	25 43 36.2	11.64	1 20.8
3	15 9 55.48	15.461	18 39 23.8	77.89	0 18.9	3	18 10 50.60	11.587	25 38 15.5	15.07	1 21.6
4	15 16 6.90	15.491	19 10 5.4	75.57	0 21.1	4	18 15 19.55	10.808	25 31 33.6	18.40	1 22.1
5	15 22 19.07	15.524	19 39 50.6	73.19	0 23.4	5	18 19 28.46	9.915	25 23 33.1	21.62	1 22.2
6	15 28 32.05	+15.558	-20 8 38.0	-70.75	0 25.7	6	18 23 14.50	+8.900	-25 14 17.1	+24.69	1 22.0
7	15 34 45.84	15.591	20 36 26.2	68.26	0 28.0	7	18 26 34.57	7.749	25 3 49.4	27.59	1 21.4
8	15 41 0.43	15.625	21 3 14.0	65.72	0 30.2	8	18 29 25.32	6.455	24 52 14.3	30.30	1 20.3
9	15 47 15.84	15.658	21 29 0.0	63.11	0 32.6	9	18 31 43.19	5.009	24 39 36.7	32.80	1 18.6
10	15 53 32.01	15.689	21 53 42.6	60.44	0 34.9	10	18 33 24.51	3.408	24 26 1.7	35.07	1 16.3
11	15 59 48.88	+15.717	-22 17 20.6	-57.72	0 37.3	11	18 34 25.58	+1.655	-24 11 35.3	+37.09	1 13.4
12	16 6 6.38	15.741	22 39 52.6	54.93	0 39.6	12	18 34 42.90	-0.235	23 56 23.1	38.88	1 9.7
13	16 12 24.40	15.760	23 1 16.9	52.09	0 42.0	13	18 34 13.43	2.239	23 40 30.9	40.43	1 5.2
14	16 18 42.81	15.773	23 21 32.3	49.18	0 44.3	14	18 32 54.85	4.319	23 24 4.5	41.74	1 0.0
15	16 25 1.43	15.778	23 40 37.1	46.21	0 46.7	15	18 30 45.98	6.419	23 7 9.4	42.81	0 53.9
16	16 31 20.08	+15.774	-23 58 29.8	-43.17	0 49.1	16	18 27 47.20	-8.465	-22 49 51.7	+43.63	0 47.0
17	16 37 38.52	15.760	24 15 8.9	40.08	0 51.5	17	18 24 0.83	10.370	22 32 17.8	44.15	0 39.3
18	16 43 56.47	15.733	24 30 33.0	36.92	0 53.8	18	18 19 31.34	12.038	22 14 35.6	44.29	0 30.9
19	16 50 13.59	15.691	24 44 40.8	33.71	0 56.2	19	18 14 25.64	13.373	21 56 55.8	43.94	0 21.9
20	16 56 29.51	15.633	24 57 30.7	30.43	0 58.5	20	18 8 52.71	14.294	21 39 31.7	42.95	0 12.4
21	17 2 43.82	+15.556	-25 9 1.0	-27.10	1 0.8	21	18 3 3.26	-14.743	-21 22 40.3	+41.19	0 3.7
22	17 8 56.01	15.456	25 19 10.6	23.72	1 3.1	22	17 57 8.92	14.702	21 6 41.6	38.54	23 43.3
23	17 15 5.49	15.330	25 27 59.0	20.28	1 5.3	23	17 51 21.33	14.185	20 51 57.4	34.98	23 33.9
24	17 21 11.62	15.175	25 35 24.0	16.80	1 7.4	24	17 45 51.44	13.237	20 38 49.1	30.57	23 24.9
25	17 27 13.64	14.987	25 41 24.9	13.28	1 9.5	25	17 40 48.76	11.936	20 27 35.9	25.42	23 16.5
26	17 33 10.70	+14.761	-25 46 1.0	-9.73	1 11.5	26	17 36 20.68	-10.570	-20 18 33.1	+19.73	23 8.8
27	17 39 1.82	14.492	25 49 11.6	6.15	1 13.4	27	17 32 32.39	8.633	20 11 51.2	15.76	23 1.8
28	17 44 45.91	14.174	25 50 56.1	-2.56	1 15.2	28	17 29 27.04	6.805	20 7 33.3	7.75	22 55.5
29	17 50 21.70	13.800	25 51 14.5	+1.03	1 16.9	29	17 27 5.95	4.956	20 5 38.0	+1.91	22 49.9
30	17 55 47.77	13.365	25 50 6.9	4.60	1 18.4	30	17 25 28.89	3.143	20 5 59.0	-3.58	22 45.1
31	18 1 2.54	+12.855	-25 47 33.8	+8.15	1 19.7	31	17 24 34.51	-1.404	-20 8 26.0	-8.58	22 40.9
32	18 6 4.17	+12.266	-25 43 36.2	+11.64	1 20.8	32	17 24 20.70	+0.235	-20 12 46.2	-13.00	22 37.3

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	29d.
Semidiameter :	2.4	2.4	2.5	2.6	2.7	2.9	Semidiameter :	3.2	3.6	4.1	4.7	4.9	4.7	4.2
Hor. Parallax . . .	6.2	6.3	6.5	6.8	7.2	7.7	Hor. Parallax . . .	8.5	9.6	11.0	12.4	13.1	12.4	11.0

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.													
JANUARY.						FEBRUARY.							
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
	<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>			<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>			
1	18 1 6.96	+13.701	-23 26 39.0	- 5.78	23 18.0	1	20 47 48.03	+12.865	-19 0 36.8	+46.35	0 1.0		
2	18 6 35.92	13.708	23 28 36.1	3.97	23 19.6	2	20 52 56.19	12.814	18 41 48.2	47.71	0 2.2		
3	18 12 5.01	13.713	23 29 49.7	2.16	23 21.1	3	20 58 3.12	12.763	18 22 27.4	49.03	0 3.4		
4	18 17 34.15	13.714	23 30 19.6	- 0.34	23 22.7	4	21 3 8.82	12.712	18 2 35.1	50.33	0 4.5		
5	18 23 3.29	13.713	23 30 5.9	+ 1.48	23 24.2	5	21 8 13.29	12.661	17 42 12.0	51.60	0 5.6		
6	18 28 32.37	+13.710	-23 29 8.6	+ 3.30	23 25.7	6	21 13 16.52	+12.609	-17 21 18.8	+52.84	0 6.7		
7	18 34 1.34	13.704	23 27 27.7	5.11	23 27.2	7	21 18 18.52	12.558	16 59 56.2	54.05	0 7.8		
8	18 39 30.13	13.695	23 25 3.2	6.92	23 28.7	8	21 23 19.30	12.507	16 38 5.0	55.23	0 8.9		
9	18 44 58.69	13.684	23 21 55.2	8.73	23 30.3	9	21 28 18.86	12.456	16 15 45.7	56.38	0 9.9		
10	18 50 26.94	13.670	23 18 3.8	10.54	23 31.8	10	21 33 17.21	12.406	15 52 59.1	57.50	0 10.9		
11	18 55 54.83	+13.654	-23 13 29.1	+12.34	23 33.3	11	21 38 14.35	+12.357	-15 29 46.0	+58.99	0 11.9		
12	19 1 22.31	13.636	23 8 11.3	14.14	23 34.8	12	21 43 10.30	12.308	15 6 7.3	59.64	0 12.9		
13	19 6 49.33	13.615	23 2 10.6	15.92	23 36.3	13	21 48 5.09	12.259	14 42 3.7	60.67	0 13.9		
14	19 12 15.81	13.592	22 55 27.3	17.69	23 37.8	14	21 52 58.72	12.211	14 17 35.9	61.66	0 14.9		
15	19 17 41.71	13.566	22 48 1.7	19.46	23 39.3	15	21 57 51.20	12.164	13 52 44.6	62.62	0 15.8		
16	19 23 6.97	+13.538	-22 39 54.0	+21.19	23 40.8	16	22 2 42.56	+12.117	-13 27 30.7	+63.55	0 16.7		
17	19 28 31.56	13.509	22 31 4.7	22.92	23 42.2	17	22 7 32.81	12.071	13 1 54.9	64.45	0 17.6		
18	19 33 55.40	13.478	22 21 34.0	24.63	23 43.7	18	22 12 21.96	12.026	12 35 58.1	65.31	0 18.5		
19	19 39 18.45	13.444	22 11 22.4	26.33	23 45.1	19	22 17 10.06	11.983	12 9 40.9	66.14	0 19.3		
20	19 44 40.67	13.408	22 0 30.3	28.01	23 46.5	20	22 21 57.13	11.940	11 43 4.1	66.94	0 20.2		
21	19 50 2.00	+13.370	-21 48 58.1	+29.67	23 47.9	21	22 26 43.19	+11.899	-11 16 8.5	+67.70	0 21.0		
22	19 55 22.41	13.331	21 36 46.3	31.31	23 49.3	22	22 31 28.28	11.859	10 48 55.0	68.43	0 21.8		
23	20 0 41.86	13.290	21 23 55.5	32.92	23 50.7	23	22 36 12.40	11.819	10 21 24.3	69.13	0 22.6		
24	20 6 0.30	13.247	21 10 26.3	34.51	23 52.1	24	22 40 55.58	11.781	9 53 37.3	69.80	0 23.4		
25	20 11 17.69	13.203	20 56 19.1	36.08	23 53.4	25	22 45 37.86	11.744	9 25 34.6	70.44	0 24.2		
26	20 16 34.02	+13.158	-20 41 34.6	+37.63	23 54.7	26	22 50 19.26	+11.708	- 8 57 17.1	+71.04	0 25.0		
27	20 21 49.26	13.111	20 26 13.2	39.13	23 56.0	27	22 54 59.83	11.673	8 28 45.5	71.61	0 25.7		
28	20 27 3.36	13.063	20 10 15.7	40.64	23 57.3	28	22 59 39.61	11.640	8 0 0.5	72.15	0 26.4		
29	20 32 16.31	13.015	19 53 42.6	42.11	23 58.5	29	23 4 18.62	11.609	7 31 2.9	72.66	0 27.1		
30	20 37 28.08	12.966	19 36 34.7	43.53	23 59.8	30	23 8 56.90	11.580	7 1 53.6	73.13	0 27.8		
31	20 42 38.66	+12.916	-19 18 52.5	+44.97		31	23 13 34.48	+11.552	- 6 32 33.2	+73.58	0 28.5		
32	20 47 48.03	+12.865	-19 0 36.8	+46.35	0 1.0	32	23 18 11.42	+11.526	- 6 3 2.5	+73.99	0 29.2		
Day of the Month.	1st.	5th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.	5th.	10th.	15th.	20th.	25th.
Semidiameter .	5.1	5.1	5.1	5.1	5.0	5.0	5.0	Semidiameter .	5.0	5.0	5.0	5.0	5.0
Hor. Parallax .	5.3	5.3	5.3	5.2	5.2	5.2	5.2	Hor. Parallax .	5.2	5.2	5.2	5.2	5.2

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.



## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	23 4 18.62	+11.609	-7 31 2.9	+72.66	0 27.1	1	1 25 51.21	+11.497	+8 3 37.4	+73.19	0 46.4
2	23 8 56.90	11.580	7 1 53.6	73.13	0 27.8	2	1 30 27.42	11.520	8 32 48.3	72.72	0 47.1
3	23 13 34.48	11.552	6 32 33.2	73.58	0 28.5	3	1 35 4.20	11.545	9 1 47.5	72.22	0 47.7
4	23 18 11.42	11.526	6 3 2.5	73.99	0 29.2	4	1 39 41.59	11.572	9 30 34.2	71.69	0 48.4
5	23 22 47.74	11.501	5 33 22.2	74.37	0 29.8	5	1 44 19.64	11.600	9 59 7.7	71.12	0 49.1
6	23 27 23.49	+11.478	-5 3 33.1	+74.73	0 30.5	6	1 48 58.38	+11.629	+10 27 27.3	+70.52	0 49.8
7	23 31 58.70	11.457	4 33 35.8	75.05	0 31.1	7	1 53 37.84	11.660	10 55 32.2	69.89	0 50.5
8	23 36 33.43	11.438	4 3 31.1	75.35	0 31.8	8	1 58 18.06	11.692	11 23 21.7	69.24	0 51.2
9	23 41 7.71	11.420	3 33 19.7	75.61	0 32.4	9	2 2 59.07	11.726	11 50 55.0	68.55	0 51.9
10	23 45 41.59	11.404	3 3 2.3	75.84	0 33.0	10	2 7 40.91	11.761	12 18 11.5	67.83	0 52.7
11	23 50 15.11	+11.390	-2 32 39.8	+76.05	0 33.6	11	2 12 23.60	+11.798	+12 45 10.4	+67.08	0 53.5
12	23 54 48.32	11.378	2 2 12.8	76.22	0 34.2	12	2 17 7.18	11.836	13 11 50.9	66.30	0 54.3
13	23 59 21.25	11.367	1 31 42.0	76.36	0 34.8	13	2 21 51.69	11.875	13 38 12.2	65.48	0 55.1
14	0 3 53.95	11.358	1 1 8.1	76.47	0 35.4	14	2 26 37.15	11.915	14 4 13.6	64.64	0 55.9
15	0 8 26.46	11.351	-0 30 31.9	76.55	0 36.0	15	2 31 23.58	11.956	14 29 54.3	63.76	0 56.7
16	0 12 58.82	+11.346	+0 0 5.6	+76.60	0 36.6	16	2 36 10.99	+11.997	+14 55 13.7	+62.86	0 57.6
17	0 17 31.09	11.343	0 30 44.2	76.61	0 37.2	17	2 40 59.40	12.039	15 20 11.1	61.92	0 58.5
18	0 22 3.32	11.342	1 1 23.0	76.60	0 37.8	18	2 45 48.85	12.082	15 44 45.5	60.95	0 59.4
19	0 26 35.53	11.342	1 32 0.9	76.56	0 38.4	19	2 50 39.34	12.126	16 8 56.2	59.95	1 0.3
20	0 31 7.77	11.344	2 2 37.5	76.49	0 39.0	20	2 55 30.90	12.171	16 32 42.5	58.92	1 1.2
21	0 35 40.07	+11.348	+2 33 11.9	+76.38	0 39.6	21	3 0 23.54	+12.216	+16 56 3.6	+57.85	1 2.1
22	0 40 12.48	11.353	3 3 43.5	76.25	0 40.2	22	3 5 17.25	12.261	17 18 58.8	56.76	1 3.1
23	0 44 45.03	11.360	3 34 11.4	76.09	0 40.8	23	3 10 12.05	12.306	17 41 27.4	55.63	1 4.1
24	0 49 17.77	11.369	4 4 35.0	75.89	0 41.4	24	3 15 7.94	12.351	18 3 28.5	54.47	1 5.1
25	0 53 50.74	11.379	4 34 53.5	75.66	0 42.0	25	3 20 4.93	12.397	18 25 1.5	53.28	1 6.1
26	0 58 23.98	+11.391	+5 5 6.1	+75.40	0 42.6	26	3 25 3.02	+12.443	+18 46 5.6	+52.06	1 7.1
27	1 2 57.52	11.405	5 35 12.1	75.11	0 43.2	27	3 30 2.21	12.489	19 6 40.2	50.82	1 8.1
28	1 7 31.41	11.420	6 5 10.9	74.79	0 43.8	28	3 35 2.49	12.535	19 26 44.5	49.54	1 9.2
29	1 12 5.69	11.437	6 35 1.5	74.43	0 44.5	29	3 40 3.85	12.580	19 46 17.9	48.24	1 10.3
30	1 16 40.39	11.455	7 4 43.3	74.05	0 45.1	30	3 45 6.29	12.624	20 5 19.6	46.90	1 11.4
31	1 21 15.55	+11.475	+7 34 15.5	+73.63	0 45.8	31	3 50 9.80	+12.668	+20 23 49.0	+45.54	1 12.5
32	1 25 51.21	+11.497	+8 3 37.4	+73.19	0 46.4	32	3 55 14.38	+12.712	+20 41 45.3	+44.15	1 13.6

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.
Semidiameter . . .	5.0	5.0	5.0	5.0	5.0	5.1	Semidiameter . . .	5.1	5.1	5.2	5.2	5.2	5.3
Hor. Parallax . . .	5.2	5.2	5.2	5.2	5.2	5.2	Hor. Parallax . . .	5.3	5.3	5.3	5.4	5.4	5.5

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

MAY.						JUNE.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	3 50 9.80	+12.668	+20 23 49.0	+45.54	1 12.5	1	6 33 9.05	+13.293	+24 41 35.5	-6.20	1 53.3
2	3 55 14.38	12.712	20 41 45.3	44.15	1 13.6	2	6 38 27.87	13.275	24 38 45.2	7.99	1 54.7
3	4 0 20.00	12.755	20 59 8.0	42.74	1 14.7	3	6 43 46.24	13.255	24 35 12.2	9.77	1 56.0
4	4 5 26.66	12.798	21 15 56.5	41.30	1 15.9	4	6 49 4.09	13.232	24 30 56.6	11.54	1 57.4
5	4 10 34.32	12.840	21 32 10.2	39.84	1 17.1	5	6 54 21.37	13.207	24 25 58.8	13.30	1 58.7
6	4 15 42.97	+12.881	+21 47 48.4	+38.35	1 18.3	6	6 59 38.02	+13.180	+24 20 18.3	-15.06	2 0.1
7	4 20 52.59	12.921	22 2 50.5	36.83	1 19.5	7	7 4 53.98	13.150	24 13 56.0	16.80	2 1.4
8	4 26 3.16	12.959	22 17 15.9	35.29	1 20.8	8	7 10 9.20	13.118	24 6 52.1	18.53	2 2.6
9	4 31 14.64	12.996	22 31 4.1	33.73	1 22.1	9	7 15 23.63	13.083	23 59 6.8	20.25	2 4.1
10	4 36 27.01	13.033	22 44 14.6	32.15	1 23.3	10	7 20 37.22	13.047	23 50 40.5	21.95	2 5.4
11	4 41 40.22	+13.068	+22 56 46.9	+30.54	1 24.6	11	7 25 49.92	+13.009	+23 41 33.6	-23.63	2 6.6
12	4 46 54.26	13.101	23 8 40.4	28.92	1 25.9	12	7 31 1.68	12.969	23 31 46.5	25.30	2 7.8
13	4 52 9.08	13.132	23 19 54.5	27.27	1 27.2	13	7 36 12.46	12.927	23 21 19.5	26.95	2 9.0
14	4 57 24.63	13.162	23 30 29.0	25.60	1 28.5	14	7 41 22.21	12.883	23 10 13.2	28.58	2 10.2
15	5 2 40.87	13.190	23 40 23.4	23.92	1 29.8	15	7 46 30.88	12.838	22 58 27.9	30.19	2 11.4
16	5 7 57.76	+13.216	+23 49 37.1	+22.22	1 31.2	16	7 51 38.44	+12.791	+22 46 4.2	-31.78	2 12.6
17	5 13 15.25	13.240	23 58 9.9	20.51	1 32.5	17	7 56 44.85	12.742	22 33 2.6	33.35	2 13.8
18	5 18 33.28	13.261	24 6 1.3	18.78	1 33.9	18	8 1 50.06	12.692	22 19 23.7	34.90	2 14.9
19	5 23 51.79	13.280	24 13 11.2	17.04	1 35.2	19	8 6 54.05	12.640	22 5 7.9	36.42	2 16.0
20	5 29 10.73	13.297	24 19 39.0	15.28	1 36.6	20	8 11 56.79	12.587	21 50 15.9	37.92	2 17.1
21	5 34 30.05	+13.312	+24 25 24.6	+13.52	1 38.0	21	8 16 58.23	+12.533	+21 34 48.2	-39.39	2 18.1
22	5 39 49.68	13.324	24 30 27.8	11.75	1 39.4	22	8 21 58.35	12.478	21 18 45.5	40.84	2 19.2
23	5 45 9.57	13.333	24 34 48.4	9.97	1 40.8	23	8 26 57.13	12.421	21 2 8.4	42.26	2 20.2
24	5 50 29.64	13.339	24 38 26.1	8.15	1 42.2	24	8 31 54.54	12.363	20 44 57.6	43.65	2 21.3
25	5 55 49.82	13.348	24 41 20.7	6.38	1 43.6	25	8 36 50.56	12.304	20 27 13.6	45.02	2 22.3
26	6 1 10.06	+13.343	+24 43 32.2	+4.59	1 45.0	26	8 41 45.16	+12.245	+20 8 57.2	-46.36	2 23.3
27	6 6 30.29	13.342	24 45 0.7	2.79	1 46.4	27	8 46 38.35	12.186	19 50 9.0	47.67	2 24.2
28	6 11 50.45	13.338	24 45 46.0	+0.99	1 47.7	28	8 51 30.12	12.126	19 30 49.8	48.95	2 25.2
29	6 17 10.47	13.331	24 45 48.1	-0.82	1 49.1	29	8 56 20.43	12.066	19 11 0.2	50.20	2 26.1
30	6 22 30.29	13.321	24 45 7.0	2.62	1 50.5	30	9 1 9.29	12.006	18 50 40.9	51.42	2 27.0
31	6 27 49.84	+13.308	+24 43 42.8	-4.41	1 51.9	31	9 5 56.69	+11.945	+18 29 52.6	-52.61	2 27.8
32	6 33 9.05	+13.293	+24 41 35.5	-6.20	1 53.3	32	9 10 42.63	+11.884	+18 8 36.0	-53.78	2 28.6
Day of the Month.						Day of the Month.					
1st. 6th. 11th. 16th. 21st. 26th. 31st.						5th. 10th. 15th. 20th. 25th. 30th.					
Semidiameter . 5.4 5.4 5.5 5.6 5.6 5.7 5.8						Semidiameter . . . 5.9 6.0 6.2 6.3 6.4 6.6					
Hor. Parallax . 5.5 5.6 5.7 5.8 5.8 5.9 6.0						Hor. Parallax . . . 6.1 6.2 6.4 6.5 6.7 6.8					

**NOTE.**—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	h m s		° ' "	"	h m		h m s		° ' "	"	h m
1	9 5 56.69	+11.845	+18 29 52.64	-52.61	2 27.8	1	11 23 29.33	+10.379	+ 4 48 48.4	-75.12	2 43.1
2	9 10 42.63	11.884	18 8 36.0	53.78	2 28.6	2	11 27 38.01	10.343	4 18 42.2	75.30	2 43.3
3	9 15 27.12	11.823	17 46 51.7	54.91	2 29.4	3	11 31 45.89	10.312	3 48 29.8	75.63	2 43.5
4	9 20 10.15	11.765	17 24 40.5	56.02	2 30.2	4	11 35 53.00	10.280	3 18 12.0	75.85	2 43.7
5	9 24 51.74	11.708	17 2 3.1	57.10	2 30.9	5	11 39 59.37	10.250	2 47 49.4	76.04	2 43.9
6	9 29 31.90	+11.644	+16 39 0.1	-58.15	2 31.6	6	11 44 5.04	+10.220	+ 2 17 22.5	-76.20	2 44.0
7	9 34 10.62	11.585	16 15 32.3	59.27	2 32.3	7	11 48 10.03	10.191	1 46 52.0	76.34	2 44.1
8	9 38 47.93	11.526	15 51 40.4	60.16	2 33.0	8	11 52 14.39	10.158	1 16 18.5	76.45	2 44.2
9	9 43 23.84	11.468	15 27 25.1	61.12	2 33.6	9	11 56 18.14	10.125	0 45 42.6	76.54	2 44.3
10	9 47 58.36	11.410	15 2 47.0	62.06	2 34.2	10	12 0 21.31	10.100	+ 0 15 5.0	76.60	2 44.4
11	9 52 31.52	+11.353	+14 37 46.8	-62.96	2 34.8	11	12 4 23.93	+10.098	- 0 15 33.6	-76.63	2 44.5
12	9 57 3.33	11.297	14 12 25.3	63.83	2 35.4	12	12 8 26.04	10.077	0 46 12.8	76.64	2 44.6
13	10 1 33.81	11.242	13 46 43.2	64.68	2 36.0	13	12 12 27.66	10.058	1 16 52.0	76.62	2 44.7
14	10 6 2.98	11.188	13 20 41.1	65.49	2 36.6	14	12 16 28.83	10.039	1 47 30.5	76.58	2 44.8
15	10 10 30.86	11.135	12 54 19.8	66.28	2 37.1	15	12 20 29.57	10.022	2 18 7.7	76.52	2 44.9
16	10 14 57.47	+11.082	+12 27 40.0	-67.03	2 37.6	16	12 24 29.91	+10.006	- 2 48 42.9	-76.42	2 44.9
17	10 19 22.83	11.031	12 0 42.4	67.75	2 38.1	17	12 28 29.86	9.990	3 19 15.4	76.29	2 45.0
18	10 23 46.97	10.980	11 33 27.8	68.45	2 38.6	18	12 32 29.44	9.975	3 49 44.6	76.14	2 45.0
19	10 28 9.90	10.931	11 5 56.8	69.12	2 39.0	19	12 36 28.67	9.961	4 20 9.9	75.96	2 45.0
20	10 32 31.65	10.882	10 38 10.1	69.76	2 39.4	20	12 40 27.59	9.948	4 50 30.7	75.76	2 45.1
21	10 36 52.24	+10.834	+10 10 8.6	-70.36	2 39.8	21	12 44 26.21	+ 9.936	- 5 20 46.3	-75.53	2 45.1
22	10 41 11.69	10.787	9 41 53.0	70.94	2 40.2	22	12 48 24.54	9.924	5 50 56.1	75.28	2 45.1
23	10 45 30.03	10.741	9 13 23.8	71.49	2 40.5	23	12 52 22.59	9.913	6 20 59.5	75.00	2 45.1
24	10 49 47.29	10.696	8 44 41.7	72.01	2 40.9	24	12 56 20.39	9.903	6 50 55.8	74.69	2 45.2
25	10 54 3.49	10.653	8 15 47.6	72.50	2 41.2	25	13 0 17.96	9.893	7 20 44.5	74.36	2 45.2
26	10 58 18.64	+10.610	+ 7 46 42.1	-72.96	2 41.5	26	13 4 15.29	+ 9.884	- 7 50 24.7	-73.99	2 45.2
27	11 2 32.78	10.568	7 17 25.9	73.39	2 41.8	27	13 8 12.40	9.875	8 19 55.9	73.60	2 45.2
28	11 6 45.94	10.528	6 47 59.8	73.79	2 42.1	28	13 12 9.30	9.867	8 49 17.5	73.19	2 45.2
29	11 10 58.15	10.489	6 18 24.3	74.16	2 42.3	29	13 16 6.01	9.859	9 18 28.9	72.76	2 45.2
30	11 15 9.44	10.451	5 48 40.1	74.51	2 42.6	30	13 20 2.53	9.851	9 47 29.7	72.30	2 45.2
31	11 19 19.82	+10.414	+ 5 18 47.9	-74.83	2 42.8	31	13 23 58.87	+ 9.844	-10 16 19.2	-71.82	2 45.2
32	11 23 29.33	+10.379	+ 4 48 48.4	-75.12	2 43.1	32	13 27 55.05	+ 9.837	-10 44 56.8	-71.31	2 45.2

Day of the Month.	8th.	10th.	15th.	20th.	25th.	30th.	Day of the Month.	4th.	9th.	14th.	19th.	24th.	29th.
Semidiameter . . .	"	"	"	"	"	"	Semidiameter . . .	"	"	"	"	"	"
Hor. Parallax . . .	6.8	7.0	7.2	7.4	7.6	7.9	Hor. Parallax . . .	8.1	8.4	8.8	9.1	9.5	10.0
	7.0	7.2	7.4	7.6	7.9	8.1		8.4	8.7	9.1	9.5	9.9	10.4

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	13 27 55.05	+9.837	-10 44 56.8	-71.31	2 45.2	1	15 23 52.18	+9.240	-22 44 44.7	-45.30	2 42.9
2	13 31 51.07	9.831	11 13 21.9	70.78	2 45.2	2	15 27 33.21	9.180	23 2 37.8	44.12	2 42.7
3	13 35 46.93	9.824	11 41 33.9	70.22	2 45.2	3	15 31 12.76	9.116	23 20 2.2	42.92	2 42.4
4	13 39 42.65	9.818	12 9 32.3	69.64	2 45.2	4	15 34 50.73	9.047	23 36 57.7	41.71	2 42.1
5	13 43 38.22	9.812	12 37 16.5	69.04	2 45.2	5	15 38 26.99	8.974	23 53 24.0	40.48	2 41.7
6	13 47 33.64	+9.806	-13 4 46.0	-68.41	2 45.1	6	15 42 1.43	+8.895	-24 9 20.8	-39.24	2 41.3
7	13 51 28.93	9.801	13 32 0.1	67.76	2 45.1	7	15 45 33.91	8.811	24 24 47.7	37.99	2 40.9
8	13 55 24.08	9.795	13 58 58.4	67.09	2 45.1	8	15 49 4.30	8.721	24 39 44.3	36.73	2 40.5
9	13 59 19.08	9.789	14 25 40.2	66.39	2 45.1	9	15 52 32.46	8.625	24 54 10.4	35.45	2 40.0
10	14 3 13.92	9.782	14 52 5.0	65.67	2 45.0	10	15 55 58.23	8.528	25 8 5.8	34.16	2 39.5
11	14 7 8.59	+9.775	-15 18 12.1	-64.92	2 45.0	11	15 59 21.47	+8.413	-25 21 30.2	-32.86	2 38.9
12	14 11 3.08	9.767	15 44 1.1	64.15	2 45.0	12	16 2 42.01	8.297	25 34 23.2	31.55	2 38.3
13	14 14 57.37	9.758	16 9 31.3	63.36	2 45.0	13	16 5 59.66	8.173	25 46 44.7	30.24	2 37.6
14	14 18 51.43	9.747	16 34 42.2	62.54	2 44.9	14	16 9 14.24	8.041	25 58 34.4	28.91	2 36.9
15	14 22 45.25	9.737	16 59 33.2	61.70	2 44.9	15	16 12 25.55	7.900	26 9 52.2	27.57	2 36.1
16	14 26 38.79	+9.725	-17 24 3.8	-60.84	2 44.8	16	16 15 33.38	+7.751	-26 20 37.8	-26.22	2 35.3
17	14 30 32.00	9.711	17 48 13.3	59.95	2 44.8	17	16 18 37.52	7.592	26 30 50.9	24.86	2 34.4
18	14 34 24.84	9.695	18 12 1.2	59.04	2 44.7	18	16 21 37.74	7.424	26 40 31.3	23.50	2 33.5
19	14 38 17.28	9.676	18 35 27.0	58.10	2 44.7	19	16 24 33.81	7.246	26 49 38.8	22.12	2 32.5
20	14 42 9.25	9.655	18 58 30.1	57.15	2 44.6	20	16 27 25.48	7.057	26 58 13.1	20.74	2 31.4
21	14 46 0.71	+9.633	-19 21 10.1	-56.18	2 44.5	21	16 30 12.49	+6.857	-27 6 14.2	-19.35	2 30.3
22	14 49 51.61	9.608	19 43 26.4	55.18	2 44.4	22	16 32 54.57	6.647	27 13 41.8	17.95	2 29.1
23	14 53 41.87	9.580	20 5 18.4	54.16	2 44.3	23	16 35 31.47	6.425	27 20 35.6	16.54	2 27.7
24	14 57 31.43	9.549	20 26 45.7	53.12	2 44.2	24	16 38 2.91	6.198	27 26 55.4	15.12	2 26.2
25	15 1 20.21	9.515	20 47 47.8	52.05	2 44.0	25	16 40 28.59	5.947	27 32 41.0	13.69	2 24.7
26	15 5 8.14	+9.478	-21 8 24.1	-50.97	2 43.9	26	16 42 48.23	+5.689	-27 37 52.0	-12.24	2 23.1
27	15 8 55.14	9.438	21 28 34.3	49.87	2 43.7	27	16 45 1.55	5.419	27 42 28.2	10.78	2 21.4
28	15 12 41.14	9.394	21 48 17.9	48.75	2 43.5	28	16 47 8.24	5.137	27 46 29.2	9.30	2 19.6
29	15 16 26.04	9.346	22 7 34.4	47.62	2 43.3	29	16 49 8.02	4.843	27 49 54.6	7.81	2 17.7
30	15 20 9.75	9.295	22 26 23.5	46.47	2 43.1	30	16 51 0.59	4.536	27 52 44.1	6.30	2 15.6
31	15 23 52.18	+9.240	-22 44 44.7	-45.30	2 42.9	31	16 52 45.65	+4.216	-27 54 57.1	-4.77	2 13.4
32	15 27 33.21	+9.180	-23 2 37.8	-44.12	2 42.7	32	16 54 22.90	+3.885	-27 56 33.1	-3.22	2 11.1

Day of the Month.	2d.	8th.	18th.	19th.	23d.	28th.	Day of the Month.	2d.	8th.	18th.	19th.	23d.	28th.
Semidiameter . . .	10.4	10.9	11.5	12.2	12.9	13.7	Semidiameter . . .	14.6	15.6	16.8	18.0	19.5	21.2
Hor. Parallax . . .	10.8	11.3	11.9	12.6	13.3	14.2	Hor. Parallax . . .	15.1	16.2	17.3	18.7	20.2	21.9

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations

GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	16 54 22.90	+3.885	-27 56 33.1	- 3.22	2 11.1	1	16 31 31.80	-6.119	-22 57 36.8	+51.92	23 43.8
2	16 55 52.05	3.541	27 57 31.6	1.64	2 8.6	2	16 29 5.42	6.072	22 36 43.1	52.48	23 37.5
3	16 57 12.81	3.186	27 57 51.9	- 0.04	2 6.0	3	16 26 40.70	5.981	22 15 39.4	52.77	23 31.2
4	16 58 24.89	2.819	27 57 33.3	+ 1.60	2 3.2	4	16 24 18.65	5.848	21 54 32.1	52.78	23 25.0
5	16 59 28.02	2.440	27 56 35.0	3.27	2 0.3	5	16 22 0.26	5.676	21 33 28.0	52.52	23 18.8
6	17 0 21.92	+2.050	-27 54 56.2	+ 4.98	1 57.3	6	16 19 46.48	-3.465	-21 12 33.5	+51.97	23 12.7
7	17 1 6.34	1.650	27 52 35.9	6.72	1 54.1	7	16 17 38.18	5.220	20 51 55.3	51.16	23 6.8
8	17 1 41.04	1.240	27 49 33.2	8.51	1 50.7	8	16 15 36.15	4.944	20 31 39.7	50.09	23 1.0
9	17 2 5.80	0.822	27 45 47.1	10.34	1 47.2	9	16 13 41.08	4.641	20 11 52.6	48.78	22 55.2
10	17 2 20.44	+0.396	27 41 16.5	12.22	1 43.5	10	16 11 53.59	4.313	19 52 39.6	47.26	22 49.6
11	17 2 24.78	-0.036	-27 36 0.2	+14.14	1 39.6	11	16 10 14.22	-3.964	-19 34 5.8	+45.33	22 44.1
12	17 2 18.68	0.472	27 29 57.1	16.12	1 35.6	12	16 8 43.44	3.598	19 16 15.7	43.61	22 38.8
13	17 2 2.04	0.913	27 23 6.1	18.14	1 31.4	13	16 7 21.62	3.218	18 59 13.4	41.54	22 33.7
14	17 1 34.83	1.355	27 15 26.0	20.21	1 27.0	14	16 6 9.06	2.827	18 43 2.8	39.33	22 28.7
15	17 0 57.01	1.796	27 6 55.7	22.32	1 22.4	15	16 5 5.98	2.428	18 27 46.5	37.02	22 23.9
16	17 0 8.63	-2.234	-26 57 34.0	+24.47	1 17.7	16	16 4 12.54	-2.023	-18 13 26.8	+34.63	22 19.3
17	16 59 9.81	2.665	26 47 20.3	26.66	1 12.8	17	16 3 28.86	1.615	18 0 5.5	32.16	22 14.8
18	16 58 0.77	3.086	26 36 13.9	28.88	1 7.7	18	16 2 55.01	1.206	17 47 43.8	29.64	22 10.5
19	16 56 41.77	3.494	26 24 14.2	31.10	1 2.4	19	16 2 30.98	0.797	17 36 22.7	27.11	22 6.3
20	16 55 13.18	3.885	26 11 21.2	33.32	0 57.0	20	16 2 16.73	-0.391	17 26 2.5	24.58	22 2.3
21	16 53 35.44	-4.255	-25 57 34.9	+35.53	0 51.4	21	16 2 12.18	+0.012	-17 16 42.9	+22.05	21 58.4
22	16 51 49.06	4.602	25 42 55.9	37.70	0 45.7	22	16 2 17.25	0.410	17 8 23.7	19.55	21 54.7
23	16 49 54.67	4.922	25 27 25.4	39.82	0 39.9	23	16 2 31.80	0.802	17 1 4.0	17.10	21 51.2
24	16 47 52.98	5.211	25 11 4.9	41.87	0 33.9	24	16 2 55.65	1.186	16 54 42.4	14.70	21 47.8
25	16 45 44.79	5.465	24 53 56.4	43.81	0 27.8	25	16 3 28.65	1.563	16 49 18.2	12.35	21 44.5
26	16 43 30.95	-5.681	-24 36 2.9	+45.63	0 21.7	26	16 4 10.63	+1.932	-16 44 49.2	+10.08	21 41.4
27	16 41 12.41	5.857	24 17 27.7	47.30	0 15.5	27	16 5 1.36	2.293	16 41 13.8	7.88	21 38.4
28	16 38 50.17	5.990	23 58 14.6	48.78	0 9.2	28	16 6 0.64	2.645	16 38 30.0	5.77	21 35.6
29	16 36 25.28	6.078	23 38 28.1	50.06	0 2.9	29	16 7 8.24	2.987	16 36 35.9	3.75	21 32.9
30	16 33 58.79	6.121	23 18 13.7	51.11	23 50.2	30	16 8 23.94	3.319	16 35 29.2	1.83	21 30.3
31	16 31 31.80	-6.119	-22 57 36.8	+51.92	23 43.8	31	16 9 47.51	+3.648	-16 35 7.7	+ 0.01	21 27.9
32	16 29 5.42	-6.072	-22 36 43.1	+52.48	23 37.5	32	16 11 18.70	+3.955	-16 35 28.4	- 1.71	21 25.5

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	29d.
Semidiameter . . .	23.0	25.0	27.0	29.0	30.8	31.9	Semidiameter . . .	32.3	31.7	30.4	28.6	26.5	24.5	22.5
Hor. Parallax . . .	23.8	25.8	28.0	30.1	31.9	33.0	Hor. Parallax . . .	33.4	32.8	31.5	29.6	27.5	25.8	23.3

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.							
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m		
1	17 57 43.61	+8.185	-24 3 49.2	-1.86	23 12.4	1	19 39 50.80	+8.188	-22 22 6.7	+18.13	22 52.3		
2	18 1 0.17	8.194	24 4 26.1	1.22	23 11.8	2	19 43 7.21	8.179	22 14 44.3	18.74	22 51.7		
3	18 4 16.94	8.202	24 4 47.6	-0.58	23 11.1	3	19 46 23.41	8.170	22 7 7.2	19.35	22 51.0		
4	18 7 33.90	8.210	24 4 53.5	+0.07	23 10.5	4	19 49 39.38	8.160	21 59 15.5	19.95	22 50.4		
5	18 10 51.04	8.217	24 4 43.9	0.72	23 9.8	5	19 52 55.10	8.150	21 51 9.3	20.55	22 49.7		
6	18 14 8.34	+8.224	-24 4 18.8	+1.57	23 9.2	6	19 56 10.57	+8.139	-21 42 48.7	+21.15	22 49.0		
7	18 17 25.80	8.230	24 3 38.1	2.02	23 8.5	7	19 59 25.79	8.128	21 34 13.9	21.74	22 48.3		
8	18 20 43.40	8.236	24 2 41.8	2.67	23 7.9	8	20 2 40.74	8.117	21 25 24.8	22.33	22 47.6		
9	18 24 1.13	8.241	24 1 29.8	3.32	23 7.2	9	20 5 55.42	8.106	21 16 21.7	22.91	22 46.9		
10	18 27 18.97	8.246	24 0 2.2	3.97	23 6.6	10	20 9 9.82	8.094	21 7 4.6	23.49	22 46.2		
11	18 30 36.91	+8.250	-23 58 18.9	+4.63	23 5.9	11	20 12 23.94	+8.082	-20 57 33.7	+24.07	22 45.5		
12	18 33 54.94	8.253	23 56 19.8	5.29	23 5.3	12	20 15 37.75	8.069	20 47 49.0	24.64	22 44.8		
13	18 37 13.04	8.256	23 54 5.0	5.95	23 4.6	13	20 18 51.25	8.056	20 37 50.6	25.20	22 44.0		
14	18 40 31.21	8.258	23 51 34.4	6.61	23 4.0	14	20 22 4.45	8.043	20 27 38.8	25.76	22 43.3		
15	18 43 49.42	8.260	23 48 48.1	7.26	23 3.4	15	20 25 17.32	8.030	20 17 13.8	26.31	22 42.5		
16	18 47 7.66	+8.261	-23 45 46.1	+7.91	23 2.7	16	20 28 29.86	+8.016	-20 6 35.6	+26.86	22 41.8		
17	18 50 25.92	8.261	23 42 28.4	8.56	23 2.1	17	20 31 42.07	8.002	19 55 44.3	27.40	22 41.0		
18	18 53 44.17	8.260	23 38 55.1	9.21	23 1.4	18	20 34 53.94	7.987	19 44 40.2	27.93	22 40.3		
19	18 57 2.40	8.259	23 35 6.1	9.86	23 0.8	19	20 38 5.45	7.972	19 33 23.4	28.46	22 39.6		
20	19 0 20.61	8.257	23 31 1.4	10.51	23 0.2	20	20 41 16.60	7.957	19 21 54.0	28.98	22 38.8		
21	19 3 38.76	+8.255	-23 26 41.2	+11.16	22 59.5	21	20 44 27.39	+7.942	-19 10 12.3	+29.49	22 38.1		
22	19 6 56.85	8.252	23 22 5.5	11.81	22 58.9	22	20 47 37.80	7.926	18 58 18.3	30.00	22 37.3		
23	19 10 14.85	8.248	23 17 14.3	12.45	22 58.2	23	20 50 47.84	7.910	18 46 12.3	30.50	22 36.5		
24	19 13 32.76	8.244	23 12 7.6	13.09	22 57.6	24	20 53 57.49	7.894	18 33 54.6	30.99	22 35.7		
25	19 16 50.56	8.239	23 6 45.6	13.73	22 56.9	25	20 57 6.75	7.878	18 21 25.1	31.47	22 34.9		
26	19 20 8.23	+8.233	-23 1 8.2	+14.37	22 56.3	26	21 0 15.61	+7.861	-18 8 43.9	+31.95	22 34.1		
27	19 23 25.75	8.227	22 55 15.6	15.01	22 55.6	27	21 3 24.08	7.845	17 55 51.4	32.42	22 33.3		
28	19 26 43.12	8.220	22 49 7.8	15.64	22 55.0	28	21 6 32.16	7.829	17 42 47.7	32.88	22 32.5		
29	19 30 0.32	8.213	22 42 45.0	16.27	22 54.3	29	21 9 39.83	7.812	17 29 33.1	33.34	22 31.7		
30	19 33 17.35	8.205	22 36 7.2	16.89	22 53.6	30	21 12 47.10	7.795	17 16 7.6	33.79	22 30.8		
31	19 36 34.18	+8.197	-22 29 14.4	+17.51	22 53.0	31	21 15 53.97	+7.778	-17 2 31.5	+34.23	22 30.0		
32	19 39 50.80	+8.188	-22 22 6.7	+18.13	22 52.3	32	21 19 0.44	+7.761	-16 48 44.8	+34.66	22 29.1		
Day of the Month.	1st.	6th.	11th.	16th.	21st.	26th.	31st.	Day of the Month.	5th.	10th.	15th.	20th.	25th.
Semidiameter .	2.1	2.1	2.1	2.1	2.1	2.1	2.2	Semidiameter .	2.2	2.2	2.2	2.3	2.3
Hor. Parallax .	3.7	3.7	3.7	3.7	3.8	3.8	3.8	Hor. Parallax .	3.8	3.9	3.9	3.9	3.9

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	21 9 39.83	+7.812	-17 29 33.1	+33.34	22 31.7	1	22 43 25.67	+7.327	-9 24 20.0	+43.61	22 3.1
2	21 12 47.10	7.795	17 16 7.6	33.79	22 30.8	2	22 46 21.36	7.314	9 6 50.7	43.82	22 2.0
3	21 15 53.97	7.778	17 2 31.5	34.23	22 30.0	3	22 49 16.73	7.301	8 49 16.7	44.01	22 1.0
4	21 19 0.44	7.761	16 48 44.8	34.66	22 29.1	4	22 52 11.79	7.288	8 31 38.1	44.19	22 0.0
5	21 22 6.51	7.744	16 34 47.8	35.09	22 28.3	5	22 55 6.55	7.276	8 13 55.1	44.37	21 59.0
6	21 25 12.18	+7.727	-16 20 40.6	+35.51	22 27.4	6	22 58 1.03	+7.264	-7 56 8.0	+44.54	21 57.9
7	21 28 17.45	7.711	16 6 23.5	35.92	22 26.6	7	23 0 55.22	7.252	7 38 16.9	44.71	21 56.8
8	21 31 22.33	7.695	15 51 56.5	36.32	22 25.7	8	23 3 49.14	7.241	7 20 22.0	44.87	21 55.8
9	21 34 26.81	7.678	15 37 19.9	36.71	22 24.9	9	23 6 42.79	7.230	7 2 23.5	45.02	21 54.7
10	21 37 30.91	7.662	15 22 33.7	37.10	22 24.0	10	23 9 36.18	7.219	6 44 21.6	45.16	21 53.7
11	21 40 34.62	+7.646	-15 7 38.2	+37.48	22 23.1	11	23 12 29.32	+7.209	-6 26 16.4	+45.29	21 52.6
12	21 43 37.93	7.630	14 52 33.7	37.86	22 22.2	12	23 15 22.21	7.199	6 8 8.2	45.40	21 51.5
13	21 46 40.86	7.614	14 37 20.4	38.24	22 21.3	13	23 18 14.86	7.189	5 49 57.1	45.50	21 50.5
14	21 49 43.41	7.598	14 21 58.3	38.61	22 20.4	14	23 21 7.28	7.179	5 31 43.4	45.60	21 49.4
15	21 52 45.58	7.582	14 6 27.7	38.96	22 19.5	15	23 23 59.47	7.170	5 13 27.3	45.70	21 48.4
16	21 55 47.36	+7.566	-13 50 48.7	+39.30	22 18.5	16	23 26 51.43	+7.161	-4 55 9.0	+45.79	21 47.3
17	21 58 48.76	7.550	13 35 1.5	39.63	22 17.6	17	23 29 43.18	7.152	4 36 48.6	45.88	21 46.2
18	22 1 49.78	7.535	13 19 6.4	39.95	22 16.6	18	23 32 34.72	7.143	4 18 26.5	45.96	21 45.1
19	22 4 50.43	7.519	13 3 3.7	40.26	22 15.7	19	23 35 26.05	7.135	4 0 2.9	46.03	21 44.0
20	22 7 50.71	7.503	12 46 53.4	40.57	22 14.8	20	23 38 17.17	7.127	3 41 37.9	46.08	21 42.9
21	22 10 50.61	+7.487	-12 30 35.9	+40.87	22 13.8	21	23 41 8.10	+7.119	-3 23 11.6	+46.12	21 41.8
22	22 13 50.14	7.472	12 14 11.2	41.16	22 12.9	22	23 43 58.85	7.111	3 4 44.3	46.15	21 40.7
23	22 16 49.30	7.457	11 57 39.7	41.45	22 11.9	23	23 46 49.41	7.103	2 46 16.3	46.17	21 39.6
24	22 19 48.09	7.442	11 41 1.5	41.73	22 11.0	24	23 49 39.79	7.096	2 27 47.6	46.19	21 38.5
25	22 22 46.52	7.427	11 24 16.8	42.00	22 10.0	25	23 52 30.00	7.089	2 9 18.5	46.21	21 37.4
26	22 25 44.58	+7.412	-11 7 25.9	+42.26	22 9.0	26	23 55 20.04	+7.082	-1 50 49.2	+46.22	21 36.3
27	22 28 42.29	7.397	10 50 28.9	42.51	22 8.0	27	23 58 9.92	7.075	1 32 19.8	46.22	21 35.2
28	22 31 39.64	7.383	10 33 26.1	42.74	22 7.1	28	0 0 59.66	7.069	1 13 50.6	46.20	21 34.1
29	22 34 36.65	7.369	10 16 17.6	42.96	22 6.1	29	0 3 49.24	7.063	0 55 21.7	46.18	21 33.0
30	22 37 33.32	7.355	9 59 3.6	43.18	22 5.1	30	0 6 38.69	7.058	0 36 53.3	46.16	21 31.9
31	22 40 29.66	+7.341	-9 41 44.3	+43.40	22 4.1	31	0 9 28.01	+7.053	-0 18 25.5	+46.13	21 30.8
32	22 43 25.67	+7.327	-9 24 20.0	+43.61	22 3.1	32	0 12 17.22	+7.048	+0 0 1.4	+46.10	21 29.7
Day of the Month.						Day of the Month.					
2d. 7th. 12th. 17th. 22d. 27th.						1st. 6th. 11th. 16th. 21st. 26th.					
Semidiameter . . . 2.3 2.3 2.3 2.3 2.4 2.4						Semidiameter . . . 2.4 2.4 2.4 2.4 2.5 2.5					
Hor. Parallax . . . 4.0 4.0 4.0 4.1 4.1 4.1						Hor. Parallax . . . 4.2 4.2 4.2 4.3 4.3 4.3					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.									
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.				
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.					
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m				
1	0 9 28.01	+7.053	-0 18 25.5	+46.13	21 30.8	1	1 36 33.05	+7.028	+ 8 52 40.3	+41.60	20 55.6				
2	0 12 17.22	7.048	+0 0 1.4	46.10	21 29.7	2	1 39 21.76	7.031	9 9 15.6	41.34	20 54.4				
3	0 15 6.32	7.044	0 18 27.3	46.06	21 28.6	3	1 42 10.53	7.034	9 25 44.8	41.08	20 53.3				
4	0 17 55.31	7.040	0 36 52.1	46.01	21 27.4	4	1 44 59.37	7.037	9 42 7.7	40.82	20 52.1				
5	0 20 44.21	7.036	0 55 15.5	45.95	21 26.3	5	1 47 48.29	7.040	9 58 24.2	40.55	20 51.0				
6	0 23 33.03	+7.033	+1 13 37.4	+45.88	21 25.2	6	1 50 37.29	+7.044	+10 14 34.1	+40.27	20 49.9				
7	0 26 21.78	7.030	1 31 57.7	45.81	21 24.0	7	1 53 26.38	7.047	10 30 37.3	39.99	20 48.8				
8	0 29 10.46	7.028	1 50 16.1	45.73	21 22.9	8	1 56 15.56	7.050	10 46 33.6	39.70	20 47.7				
9	0 31 59.08	7.026	2 8 32.5	45.64	21 21.7	9	1 59 4.82	7.054	11 2 22.8	39.40	20 46.5				
10	0 34 47.65	7.024	2 26 46.7	45.54	21 20.6	10	2 1 54.18	7.058	11 18 4.9	39.10	20 45.4				
11	0 37 36.17	+7.022	+2 44 58.5	+45.44	21 19.5	11	2 4 43.63	+7.062	+11 33 39.6	+38.79	20 44.3				
12	0 40 24.66	7.020	3 3 7.8	45.33	21 18.3	12	2 7 33.18	7.066	11 49 6.8	38.47	20 43.2				
13	0 43 13.11	7.019	3 21 14.3	45.21	21 17.2	13	2 10 22.83	7.070	12 4 26.5	38.15	20 42.1				
14	0 46 1.54	7.018	3 39 17.9	45.08	21 16.0	14	2 13 12.57	7.074	12 19 38.5	37.82	20 41.0				
15	0 48 49.94	7.017	3 57 18.4	44.95	21 14.9	15	2 16 2.40	7.078	12 34 42.6	37.49	20 39.9				
16	0 51 38.32	+7.016	+4 15 15.6	+44.81	21 13.8	16	2 18 52.33	+7.082	+12 49 38.6	+37.16	20 38.8				
17	0 54 26.69	7.015	4 33 9.3	44.66	21 12.6	17	2 21 42.35	7.086	13 4 26.4	36.82	20 37.7				
18	0 57 15.04	7.015	4 50 59.3	44.50	21 11.5	18	2 24 32.45	7.090	13 19 5.8	36.47	20 36.6				
19	1 0 3.39	7.014	5 8 45.4	44.33	21 10.3	19	2 27 22.64	7.094	13 33 36.8	36.11	20 35.5				
20	1 2 51.73	7.014	5 26 27.6	44.16	21 9.2	20	2 30 12.91	7.097	13 47 59.2	35.75	20 34.4				
21	1 5 40.07	+7.014	+5 44 5.6	+43.98	21 8.1	21	2 33 3.27	+7.100	+14 2 12.9	+35.39	20 33.3				
22	1 8 28.41	7.014	6 1 39.2	43.80	21 7.0	22	2 35 53.71	7.104	14 16 17.8	35.02	20 32.2				
23	1 11 16.76	7.015	6 19 8.2	43.61	21 5.9	23	2 38 44.24	7.108	14 30 13.8	34.64	20 31.1				
24	1 14 5.12	7.015	6 36 32.6	43.41	21 4.7	24	2 41 34.85	7.111	14 44 0.8	34.26	20 30.0				
25	1 16 53.50	7.016	6 53 52.1	43.20	21 3.6	25	2 44 25.53	7.114	14 57 38.6	33.88	20 28.9				
26	1 19 41.91	+7.017	+7 11 6.6	+42.99	21 2.5	26	2 47 16.28	+7.117	+15 11 7.1	+33.49	20 27.8				
27	1 22 30.34	7.018	7 28 15.9	42.78	21 1.3	27	2 50 7.12	7.121	15 24 26.3	33.10	20 26.7				
28	1 25 18.79	7.020	7 45 20.0	42.56	21 0.2	28	2 52 58.04	7.125	15 37 36.1	32.70	20 25.6				
29	1 28 7.28	7.022	8 2 18.6	42.33	20 59.0	29	2 55 49.04	7.128	15 50 36.3	32.30	20 24.5				
30	1 30 55.82	7.024	8 19 11.6	42.09	20 57.9	30	2 58 40.12	7.131	16 3 26.9	31.90	20 23.4				
31	1 33 44.41	+7.026	+8 35 58.9	+41.85	20 56.7	31	3 1 31.29	+7.134	+16 16 7.8	+31.50	20 22.3				
32	1 36 33.05	+7.028	+8 52 40.3	+41.60	20 55.6	32	3 4 22.53	+7.137	+16 28 38.9	+31.09	20 21.2				
Day of the Month.								Day of the Month.							
1st. 6th. 11th. 16th. 21st. 26th. 31st.								5th. 10th. 15th. 20th. 25th. 30th.							
Semidiameter . 2.5 2.5 2.6 2.6 2.6 2.6 2.7								Semidiameter . . . 2.7 2.7 2.7 2.8 2.8 2.8							
Hor. Parallax . 4.4 4.4 4.5 4.5 4.6 4.6 4.6								Hor. Parallax . . . 4.7 4.7 4.8 4.8 4.9 4.9							

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.



## GREENWICH MEAN TIME.

JULY.						AUGUST.								
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.			
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.				
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m			
1	3 1 31.29	+7.134	+16 16 7.8	+31.50	20 22.3	1	4 30 10.39	+7.114	+21 21 38.7	+17.41	19 48.8			
2	3 4 22.53	7.137	16 28 38.9	31.09	20 21.2	2	4 33 1.06	7.108	21 28 30.9	16.94	19 47.7			
3	3 7 13.85	7.140	16 41 0.1	30.68	20 20.2	3	4 35 51.59	7.102	21 35 11.7	16.46	19 46.6			
4	3 10 5.24	7.143	16 53 11.2	30.26	20 19.2	4	4 38 41.97	7.096	21 41 41.0	15.98	19 45.5			
5	3 12 56.71	7.146	17 5 12.3	29.84	20 18.1	5	4 41 32.19	7.089	21 47 58.8	15.50	19 44.4			
6	3 15 48.25	+7.149	+17 17 3.4	+29.41	20 17.0	6	4 44 22.23	+7.081	+21 54 5.2	+15.02	19 43.3			
7	3 18 39.85	7.152	17 28 44.2	28.98	20 15.9	7	4 47 12.08	7.073	22 0 0.2	14.54	19 42.2			
8	3 21 31.52	7.154	17 40 14.4	28.54	20 14.8	8	4 50 1.73	7.064	22 5 43.8	14.07	19 41.1			
9	3 24 23.25	7.156	17 51 34.1	28.10	20 13.8	9	4 52 51.17	7.055	22 11 16.0	13.60	19 40.0			
10	3 27 15.03	7.158	18 2 43.4	27.66	20 12.7	10	4 55 40.38	7.046	22 16 36.8	13.13	19 38.9			
11	3 30 6.86	+7.160	+18 13 42.1	+27.22	20 11.6	11	4 58 29.36	+7.036	+22 21 46.1	+12.66	19 37.8			
12	3 32 58.72	7.161	18 24 30.2	26.77	20 10.5	12	5 1 18.08	7.025	22 26 44.0	12.19	19 36.6			
13	3 35 50.61	7.162	18 35 7.5	26.32	20 9.4	13	5 4 6.51	7.013	22 31 30.7	11.72	19 35.5			
14	3 38 42.53	7.162	18 45 33.9	25.87	20 8.4	14	5 6 54.65	7.000	22 36 6.1	11.25	19 34.3			
15	3 41 34.46	7.163	18 55 49.4	25.42	20 7.3	15	5 9 42.49	6.987	22 40 30.4	10.78	19 33.2			
16	3 44 26.38	+7.163	+19 5 54.0	+24.96	20 6.2	16	5 12 30.02	+6.973	+22 44 43.5	+10.31	19 32.0			
17	3 47 18.30	7.162	19 15 47.5	24.50	20 5.1	17	5 15 17.20	6.959	22 48 45.4	9.85	19 30.8			
18	3 50 10.20	7.161	19 25 30.0	24.04	20 4.0	18	5 18 4.04	6.944	22 52 36.2	9.39	19 29.7			
19	3 53 2.08	7.160	19 35 1.3	23.57	20 3.0	19	5 20 50.51	6.929	22 56 16.1	8.93	19 28.5			
20	3 55 53.91	7.159	19 44 21.5	23.10	20 1.9	20	5 23 36.61	6.913	22 59 45.0	8.48	19 27.3			
21	3 58 45.71	+7.157	+19 53 30.4	+22.63	20 0.8	21	5 26 22.32	+6.897	+23 3 3.2	+8.03	19 26.1			
22	4 1 37.46	7.155	20 2 27.9	22.16	19 59.7	22	5 29 7.63	6.880	23 6 10.5	7.58	19 24.9			
23	4 4 29.15	7.152	20 11 14.0	21.69	19 58.6	23	5 31 52.51	6.862	23 9 7.1	7.14	19 23.7			
24	4 7 20.76	7.149	20 19 49.0	21.22	19 57.6	24	5 34 36.97	6.844	23 11 53.1	6.70	19 22.5			
25	4 10 12.30	7.146	20 28 12.6	20.75	19 56.5	25	5 37 20.99	6.825	23 14 28.6	6.26	19 21.3			
26	4 13 3.76	+7.142	+20 36 24.8	+20.27	19 55.4	26	5 40 4.56	+6.806	+23 16 53.6	+5.83	19 20.1			
27	4 15 55.13	7.138	20 44 25.7	19.79	19 54.3	27	5 42 47.67	6.787	23 19 8.2	5.40	19 18.8			
28	4 18 46.40	7.134	20 52 15.2	19.32	19 53.2	28	5 45 30.31	6.767	23 21 12.5	4.97	19 17.6			
29	4 21 37.57	7.130	20 59 53.2	18.84	19 52.1	29	5 48 12.47	6.747	23 23 6.7	4.55	19 16.4			
30	4 24 28.64	7.125	21 7 19.9	18.37	19 51.0	30	5 50 54.14	6.726	23 24 50.8	4.13	19 15.1			
31	4 27 19.58	+7.120	+21 14 35.1	+17.89	19 49.9	31	5 53 35.30	+6.704	+23 26 24.9	+3.72	19 13.9			
32	4 30 10.39	+7.114	+21 21 38.7	+17.41	19 48.8	32	5 56 15.95	+6.682	+23 27 49.0	+3.31	19 12.6			
Day of the Month.						Day of the Month.								
		5th.	10th.	15th.	20th.	25th.	30th.		4th.	9th.	14th.	19th.	24th.	29th.
Semidiameter . . .		2.9	2.9	2.9	3.0	3.0	3.1	Semidiameter . . .	3.1	3.2	3.2	3.3	3.3	3.4
Hor. Parallax . . .		5.0	5.1	5.1	5.2	5.2	5.3	Hor. Parallax . . .	5.4	5.5	5.6	5.7	5.8	5.9

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	" ' "	"	h m		h m s	s	" ' "	"	h m
1	5 56 15.95	+6.682	+23 27 49.0	+3.31	19 12.6	1	7 11 16.30	+5.722	+23 4 24.3	-6.18	18 29.0
2	5 58 56.07	6.660	23 29 3.3	2.90	19 11.3	2	7 13 33.13	5.680	23 1 53.5	6.98	18 27.4
3	6 1 35.64	6.637	23 30 8.0	2.50	19 10.0	3	7 15 48.96	5.638	22 59 17.9	6.57	18 25.7
4	6 4 14.66	6.614	23 31 3.1	2.10	19 8.7	4	7 18 3.76	5.595	22 56 37.8	6.76	18 24.0
5	6 6 53.10	6.590	23 31 48.7	1.71	19 7.4	5	7 20 17.52	5.551	22 53 53.4	6.94	18 22.2
6	6 9 30.95	+6.565	+23 32 25.0	+1.33	19 6.1	6	7 22 30.21	+5.506	+22 51 5.0	-7.11	18 20.5
7	6 12 8.20	6.539	23 32 52.1	0.95	19 4.8	7	7 24 41.82	5.460	22 48 12.7	7.26	18 18.7
8	6 14 44.82	6.512	23 33 10.2	0.58	19 3.4	8	7 26 52.32	5.413	22 45 16.8	7.40	18 16.9
9	6 17 20.80	6.485	23 33 19.3	+0.21	19 2.0	9	7 29 1.69	5.366	22 42 17.5	7.53	18 15.1
10	6 19 56.12	6.457	23 33 19.6	-0.15	19 0.7	10	7 31 9.90	5.318	22 39 15.2	7.65	18 13.3
11	6 22 30.76	+6.428	+23 33 11.2	-0.51	18 59.3	11	7 33 16.94	+5.269	+22 36 10.0	-7.76	18 11.5
12	6 25 4.71	6.399	23 32 54.4	0.86	18 57.9	12	7 35 22.78	5.219	22 33 2.2	7.86	18 9.7
13	6 27 37.94	6.369	23 32 29.3	1.21	18 56.5	13	7 37 27.39	5.167	22 29 52.1	7.95	18 7.8
14	6 30 10.44	6.339	23 31 56.0	1.55	18 55.1	14	7 39 30.76	5.114	22 26 40.0	8.04	18 5.9
15	6 32 42.19	6.308	23 31 14.7	1.88	18 53.7	15	7 41 32.87	5.060	22 23 26.0	8.12	18 4.0
16	6 35 13.17	+6.276	+23 30 25.6	-2.20	18 52.3	16	7 43 33.69	+5.006	+22 20 10.4	-8.18	18 2.0
17	6 37 43.37	6.245	23 29 28.8	2.52	18 50.9	17	7 45 33.21	4.951	22 16 53.5	8.23	18 0.0
18	6 40 12.77	6.209	23 28 24.5	2.85	18 49.4	18	7 47 31.39	4.896	22 13 35.6	8.27	17 58.0
19	6 42 41.36	6.174	23 27 12.8	3.14	18 47.9	19	7 49 28.23	4.840	22 10 16.9	8.29	17 56.0
20	6 45 9.12	6.139	23 25 53.9	3.44	18 46.4	20	7 51 23.70	4.783	22 6 57.6	8.30	17 54.0
21	6 47 36.04	+6.104	+23 24 28.0	-3.73	18 44.9	21	7 53 17.78	+4.725	+22 3 38.0	-8.30	17 51.9
22	6 50 2.11	6.068	23 22 55.4	4.01	18 43.4	22	7 55 10.46	4.666	22 0 18.3	8.29	17 49.9
23	6 52 27.32	6.032	23 21 16.2	4.28	18 41.9	23	7 57 1.71	4.606	21 56 58.9	8.28	17 47.8
24	6 54 51.65	5.995	23 19 30.5	4.54	18 40.3	24	7 58 51.51	4.545	21 53 39.9	8.27	17 45.6
25	6 57 15.08	5.957	23 17 38.5	4.80	18 38.8	25	8 0 39.86	4.483	21 50 21.7	8.25	17 43.5
26	6 59 37.61	+5.919	+23 15 40.4	-5.05	18 37.2	26	8 2 26.71	+4.420	+21 47 4.4	-8.21	17 41.3
27	7 1 59.23	5.881	23 13 36.2	5.29	18 35.6	27	8 4 12.05	4.356	21 43 48.4	8.15	17 39.1
28	7 4 19.93	5.842	23 11 26.4	5.52	18 34.0	28	8 5 55.86	4.292	21 40 33.9	8.07	17 36.9
29	7 6 39.68	5.803	23 9 11.0	5.75	18 32.3	29	8 7 38.11	4.227	21 37 21.2	7.98	17 34.6
30	7 8 58.47	5.765	23 6 50.2	5.97	18 30.7	30	8 9 18.77	4.161	21 34 10.7	7.89	17 32.3
31	7 11 16.30	+5.722	+23 4 24.3	-6.18	18 29.0	31	8 10 57.83	+4.093	+21 31 2.6	-7.78	17 30.0
32	7 13 33.13	+5.680	+23 1 53.5	-6.38	18 27.4	32	8 12 35.24	+4.024	+21 27 57.2	-7.66	17 27.7
Day of the Month.						Day of the Month.					
	"	"	"	"	"		"	"	"	"	"
Semidiameter . . .	3.4	3.5	3.6	3.7	3.8	Semidiameter . . .	4.0	4.1	4.2	4.4	4.5
Hor. Parallax . . .	6.0	6.1	6.3	6.4	6.6	Hor. Parallax . . .	6.9	7.1	7.3	7.6	7.8

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	8 12 35.24	+4.024	+21 27 57.2	-7.66	17 27.7	1	8 45 28.58	+1.208	+20 42 50.1	+2.03	16 1.7
2	8 14 10.97	3.953	21 24 54.8	7.53	17 25.3	2	8 45 56.13	1.086	20 43 44.9	2.54	15 58.2
3	8 15 44.98	3.881	21 21 55.8	7.38	17 22.9	3	8 46 20.72	0.962	20 44 52.0	3.06	15 54.6
4	8 17 17.25	3.807	21 19 0.5	7.22	17 20.5	4	8 46 42.31	0.836	20 46 11.6	3.59	15 51.0
5	8 18 47.74	3.732	21 16 9.2	7.04	17 18.1	5	8 47 0.84	0.708	20 47 44.0	4.12	15 47.4
6	8 20 16.40	+3.656	+21 13 22.2	-6.85	17 15.6	6	8 47 16.27	+0.578	+20 49 29.3	+4.66	15 43.7
7	8 21 43.20	3.578	21 10 39.9	6.65	17 13.1	7	8 47 28.54	0.445	20 51 27.7	5.21	15 39.9
8	8 23 8.12	3.499	21 8 2.6	6.44	17 10.5	8	8 47 37.61	0.310	20 53 39.4	5.76	15 36.1
9	8 24 31.13	3.418	21 5 30.6	6.21	17 7.9	9	8 47 43.42	0.173	20 56 4.4	6.32	15 32.2
10	8 25 52.16	3.335	21 3 4.3	5.97	17 5.3	10	8 47 45.93	+0.035	20 58 42.8	6.88	15 28.3
11	8 27 11.15	+3.250	+21 0 44.1	-5.71	17 2.7	11	8 47 45.12	-0.104	+21 1 34.7	+7.44	15 24.3
12	8 28 28.09	3.163	20 58 30.2	5.44	17 0.0	12	8 47 40.94	0.245	21 4 40.0	8.00	15 20.3
13	8 29 42.95	3.075	20 56 23.1	5.15	16 57.3	13	8 47 33.37	0.387	21 7 58.7	8.55	15 16.2
14	8 30 55.69	2.986	20 54 23.0	4.85	16 54.6	14	8 47 22.37	0.580	21 11 30.6	9.10	15 12.0
15	8 32 6.25	2.895	20 52 29.9	4.54	16 51.8	15	8 47 7.92	0.674	21 15 15.8	9.64	15 7.8
16	8 33 14.60	+2.802	+20 50 44.3	-4.22	16 49.0	16	8 46 50.01	-0.812	+21 19 14.0	+10.18	15 3.5
17	8 34 20.71	2.707	20 49 6.7	3.89	16 46.1	17	8 46 28.61	0.963	21 23 25.1	10.71	14 59.2
18	8 35 24.54	2.611	20 47 37.5	3.54	16 43.2	18	8 46 3.73	1.109	21 27 48.8	11.24	14 54.8
19	8 36 26.04	2.514	20 46 16.7	3.18	16 40.3	19	8 45 35.36	1.255	21 32 24.8	11.75	14 50.4
20	8 37 25.19	2.415	20 45 4.6	2.81	16 37.3	20	8 45 3.50	1.400	21 37 12.9	12.25	14 45.9
21	8 38 21.96	+2.314	+20 44 1.5	-2.43	16 34.3	21	8 44 28.14	-1.545	+21 42 12.7	+12.73	14 41.4
22	8 39 16.30	2.212	20 43 7.8	2.04	16 31.2	22	8 43 49.31	1.689	21 47 23.7	13.19	14 36.8
23	8 40 8.14	2.108	20 42 23.7	1.63	16 28.1	23	8 43 7.02	1.833	21 52 45.7	13.65	14 32.1
24	8 40 57.47	2.002	20 41 49.4	1.21	16 25.0	24	8 42 21.30	1.976	21 58 18.0	14.05	14 27.4
25	8 41 44.25	1.894	20 41 25.3	0.78	16 21.8	25	8 41 32.15	2.117	22 4 0.3	14.45	14 22.6
26	8 42 28.43	+1.784	+20 41 11.7	-0.34	16 18.5	26	8 40 39.62	-2.257	+22 9 51.9	+14.83	14 17.8
27	8 43 9.95	1.673	20 41 8.8	+0.11	16 15.2	27	8 39 43.74	2.396	22 15 52.4	15.19	14 12.9
28	8 43 48.77	1.560	20 41 16.9	0.57	16 11.9	28	8 38 44.57	2.535	22 22 1.1	15.52	14 7.9
29	8 44 24.85	1.445	20 41 36.3	1.04	16 8.6	29	8 37 42.14	2.668	22 28 17.4	15.83	14 2.9
30	8 44 58.14	1.328	20 42 7.3	1.53	16 5.2	30	8 36 36.52	2.800	22 34 40.6	16.10	13 57.9
31	8 45 28.58	+1.208	+20 42 50.1	+2.03	16 1.7	31	8 35 27.76	-2.929	+22 41 10.0	+16.34	13 52.8
32	8 45 56.13	+1.086	+20 43 44.9	+2.54	15 58.2	32	8 34 15.94	-3.055	+22 47 44.9	+16.55	13 47.6

Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	Day of the Month.	2d.	7th.	12th.	17th.	22d.	27th.	32d.
Semidiameter . . .	4.8	5.0	5.2	5.4	5.6	5.9	Semidiameter . . .	6.1	6.4	6.6	6.9	7.1	7.3	7.5
Hor. Parallax . . .	8.4	8.7	9.0	9.4	9.8	10.2	Hor. Parallax . . .	10.6	11.1	11.5	12.0	12.4	12.8	13.1

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	" "	"	h m		h m s	s	" "	"	h m
1	12 36 50.50	+0.665	-2 32 24.0	-3.55	17 49.4	1	12 39 44.03	-0.317	-2 41 52.1	+2.10	15 50.2
2	12 37 6.15	0.639	2 33 47.2	3.38	17 45.8	2	12 39 38.48	0.246	2 40 59.6	2.28	15 46.2
3	12 37 21.17	0.613	2 35 6.3	3.21	17 42.1	3	12 39 32.25	0.275	2 40 2.8	2.46	15 42.1
4	12 37 35.56	0.586	2 36 21.3	3.04	17 38.4	4	12 39 25.33	0.303	2 39 1.8	2.63	15 38.1
5	12 37 49.31	0.559	2 37 32.1	2.86	17 34.7	5	12 39 17.72	0.332	2 37 56.5	2.81	15 34.0
6	12 38 2.41	+0.532	-2 38 38.7	-2.69	17 30.9	6	12 39 9.42	-0.360	-2 36 46.9	+2.99	15 29.9
7	12 38 14.86	0.505	2 39 41.1	2.51	17 27.2	7	12 39 0.45	0.388	2 35 33.1	3.16	15 25.9
8	12 38 26.66	0.477	2 40 39.2	2.33	17 23.5	8	12 38 50.81	0.416	2 34 15.1	3.34	15 21.8
9	12 38 37.80	0.450	2 41 33.1	2.15	17 19.7	9	12 38 40.49	0.444	2 32 53.0	3.52	15 17.7
10	12 38 48.28	0.423	2 42 22.7	1.97	17 15.9	10	12 38 29.50	0.472	2 31 26.7	3.69	15 13.5
11	12 38 58.09	+0.395	-2 43 7.9	-1.79	17 12.2	11	12 38 17.85	-0.500	-2 29 56.4	+3.86	15 9.4
12	12 39 7.24	0.367	2 43 48.8	1.61	17 8.4	12	12 38 5.55	0.527	2 28 22.0	4.02	15 5.3
13	12 39 15.70	0.339	2 44 25.4	1.43	17 4.6	13	12 37 52.59	0.554	2 26 43.6	4.18	15 1.1
14	12 39 23.48	0.310	2 44 57.5	1.25	17 0.8	14	12 37 38.97	0.580	2 25 1.2	4.34	14 56.9
15	12 39 30.58	0.282	2 45 25.2	1.07	16 57.0	15	12 37 24.73	0.606	2 23 15.0	4.50	14 52.7
16	12 39 37.01	+0.253	-2 45 48.4	-0.88	16 53.1	16	12 37 9.87	-0.632	-2 21 25.0	+4.66	14 48.6
17	12 39 42.74	0.224	2 46 7.2	0.69	16 49.3	17	12 36 54.38	0.658	2 19 31.1	4.82	14 44.4
18	12 39 47.78	0.195	2 46 21.5	0.51	16 45.4	18	12 36 38.27	0.683	2 17 33.5	4.97	14 40.2
19	12 39 52.12	0.166	2 46 31.4	0.32	16 41.6	19	12 36 21.56	0.708	2 15 32.3	5.12	14 35.9
20	12 39 55.73	0.136	2 46 36.8	-0.13	16 37.7	20	12 36 4.26	0.733	2 13 27.5	5.27	14 31.7
21	12 39 58.64	+0.107	-2 46 37.6	+0.06	16 33.8	21	12 35 46.37	-0.757	-2 11 19.2	+5.42	14 27.5
22	12 40 0.84	0.077	2 46 34.0	0.25	16 29.9	22	12 35 27.90	0.781	2 9 7.4	5.56	14 23.2
23	12 40 2.33	0.047	2 46 25.9	0.44	16 26.0	23	12 35 8.88	0.804	2 6 52.4	5.70	14 19.0
24	12 40 3.12	+0.017	2 46 13.3	0.63	16 22.0	24	12 34 49.33	0.826	2 4 34.2	5.83	14 14.7
25	12 40 3.20	-0.012	2 45 56.1	0.81	16 18.1	25	12 34 29.25	0.848	2 2 12.8	5.96	14 10.5
26	12 40 2.58	-0.041	-2 45 34.5	+0.99	16 14.2	26	12 34 8.63	-0.869	-1 59 48.3	+6.08	14 6.2
27	12 40 1.25	0.071	2 45 8.5	1.18	16 10.2	27	12 33 47.51	0.890	1 57 20.9	6.20	14 1.9
28	12 39 59.21	0.100	2 44 38.1	1.36	16 6.2	28	12 33 25.91	0.910	1 54 50.7	6.32	13 57.6
29	12 39 56.47	0.129	2 44 3.2	1.55	16 2.2	29	12 33 3.85	0.929	1 52 17.6	6.43	13 53.3
30	12 39 53.03	0.159	2 43 23.9	1.73	15 58.2	30	12 32 41.32	0.948	1 49 41.8	6.54	13 49.0
31	12 39 48.88	-0.188	-2 42 40.2	+1.92	15 54.2	31	12 32 18.34	-0.966	-1 47 3.6	+6.64	13 44.7
32	12 39 44.03	-0.217	-2 41 52.1	+2.10	15 50.2	32	12 31 54.93	-0.983	-1 44 23.0	+6.74	13 40.3
Day of the Month.		0d.	8th.	16th.	24th.	Day of the Month.		1st.	9th.	17th.	25th.
Semidiameter . . . . .		17.6	18.1	18.5	19.0	Semidiameter . . . . .		19.4	19.8	20.2	20.6
Horizontal Parallax . . . . .		1.7	1.7	1.7	1.8	Horizontal Parallax . . . . .		1.8	1.9	1.9	1.9

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

MARCH.						APRIL.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	12 33 3.85	-0.929	-1 52 17.6	+6.43	13 53.3	1	12 19 15.49	-1.169	-0 20 38.7	+7.50	11 37.7
2	12 32 41.32	0.948	1 49 41.8	6.54	13 49.0	2	12 18 47.48	1.164	0 17 39.1	7.45	11 33.3
3	12 32 18.34	0.966	1 47 3.6	6.64	13 44.7	3	12 18 19.60	1.158	0 14 40.9	7.39	11 28.9
4	12 31 54.93	0.983	1 44 23.0	6.74	13 40.3	4	12 17 51.88	1.151	0 11 44.2	7.33	11 24.5
5	12 31 31.11	1.000	1 41 40.0	6.83	13 36.0	5	12 17 24.34	1.143	0 8 49.0	7.27	11 20.1
6	12 31 6.89	-1.017	-1 38 54.7	+6.92	13 31.7	6	12 16 57.00	-1.135	-0 5 55.3	+7.20	11 15.7
7	12 30 42.28	1.033	1 36 7.4	7.01	13 27.3	7	12 16 29.87	1.126	0 3 3.4	7.12	11 11.3
8	12 30 17.31	1.048	1 33 18.0	7.09	13 23.0	8	12 16 2.96	1.116	-0 0 13.5	7.04	11 7.0
9	12 29 52.00	1.062	1 30 26.6	7.17	13 18.6	9	12 15 36.30	1.105	+0 2 34.4	6.95	11 2.6
10	12 29 26.35	1.076	1 27 33.4	7.24	13 14.3	10	12 15 9.90	1.094	0 5 20.4	6.86	10 58.2
11	12 29 0.38	-1.089	-1 24 38.6	+7.31	13 9.9	11	12 14 43.79	-1.082	+0 8 4.2	+6.77	10 53.9
12	12 28 34.11	1.101	1 21 42.2	7.38	13 5.6	12	12 14 17.97	1.069	0 10 45.6	6.67	10 49.6
13	12 28 7.56	1.112	1 18 44.2	7.44	13 1.2	13	12 13 52.47	1.056	0 13 24.5	6.57	10 45.2
14	12 27 40.74	1.122	1 15 44.9	7.49	12 56.8	14	12 13 27.30	1.042	0 16 1.0	6.46	10 40.8
15	12 27 13.68	1.132	1 12 44.5	7.54	12 52.4	15	12 13 2.47	1.027	0 18 34.8	6.35	10 36.5
16	12 26 46.39	-1.141	-1 9 43.0	+7.59	12 48.0	16	12 12 38.02	-1.011	+0 21 5.8	+6.23	10 32.2
17	12 26 18.90	1.149	1 6 40.3	7.63	12 43.6	17	12 12 13.95	0.995	0 23 34.0	6.11	10 27.8
18	12 25 51.22	1.157	1 3 36.8	7.67	12 39.2	18	12 11 50.27	0.978	0 25 59.3	5.99	10 23.5
19	12 25 23.36	1.163	1 0 32.8	7.69	12 34.9	19	12 11 27.01	0.960	0 28 21.7	5.86	10 19.2
20	12 24 55.36	1.169	0 57 28.2	7.71	12 30.5	20	12 11 4.18	0.942	0 30 40.9	5.73	10 14.9
21	12 24 27.24	-1.174	-0 54 23.0	+7.72	12 26.1	21	12 10 41.79	-0.923	+0 32 56.9	+5.59	10 10.6
22	12 23 59.01	1.178	0 51 17.6	7.72	12 21.7	22	12 10 19.85	0.904	0 35 9.7	5.45	10 6.3
23	12 23 30.69	1.181	0 48 12.2	7.73	12 17.3	23	12 9 58.40	0.884	0 37 19.0	5.31	10 2.0
24	12 23 2.30	1.184	0 45 6.7	7.73	12 12.9	24	12 9 37.43	0.863	0 39 24.7	5.17	9 57.7
25	12 22 33.88	1.186	0 42 1.2	7.72	12 8.5	25	12 9 16.96	0.842	0 41 26.9	5.02	9 53.4
26	12 22 5.44	-1.186	-0 38 56.1	+7.70	12 4.1	26	12 8 56.99	-0.821	+0 43 25.6	+4.87	9 49.2
27	12 21 36.99	1.183	0 35 51.5	7.68	11 59.7	27	12 8 37.55	0.799	0 45 20.6	4.71	9 44.9
28	12 21 8.56	1.183	0 32 47.4	7.65	11 55.3	28	12 8 18.64	0.777	0 47 11.8	4.55	9 40.7
29	12 20 40.19	1.181	0 29 43.8	7.62	11 50.9	29	12 8 0.27	0.754	0 48 59.2	4.39	9 36.5
30	12 20 11.87	1.178	0 26 41.0	7.59	11 46.5	30	12 7 42.46	0.731	0 50 42.7	4.23	9 32.2
31	12 19 43.63	-1.174	-0 23 39.3	+7.55	11 42.1	31	12 7 25.21	-0.707	+0 52 22.4	+4.07	9 28.0
32	12 19 15.49	-1.169	-0 20 38.7	+7.50	11 37.7	32	12 7 8.53	-0.683	+0 53 58.1	+3.90	9 23.8
Day of the Month.						Day of the Month.					
5th.						5th.					
18th.						18th.					
21st.						21st.					
29th.						29th.					
Semidiameter . . . . .						Semidiameter . . . . .					
Horizontal Parallax . .						Horizontal Parallax . .					
20.8 21.0 21.1 21.1						21.0 20.9 20.6 20.3					
2.0 2.0 2.0 2.0						2.0 2.0 1.9 1.9					

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.										
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.					
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.						
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m					
1	12 7 25.21	-0.707	+0 52 22.4	+4.07	9 28.0	1	12 3 39.57	+0.120	+1 9 1.3	-1.46	7 22.5					
2	12 7 8.53	0.683	0 53 58.1	3.90	9 23.8	2	12 3 42.78	0.147	1 8 24.1	1.64	7 18.6					
3	12 6 52.43	0.659	0 55 29.8	3.74	9 19.6	3	12 3 46.63	0.174	1 7 42.7	1.82	7 14.8					
4	12 6 36.90	0.635	0 56 57.6	3.58	9 15.4	4	12 3 51.13	0.201	1 6 57.1	1.99	7 10.9					
5	12 6 21.97	0.610	0 58 21.2	3.41	9 11.3	5	12 3 56.28	0.228	1 6 7.2	2.17	7 7.1					
6	12 6 7.64	-0.585	+0 59 40.8	+3.24	9 7.1	6	12 4 2.07	+0.255	+1 5 13.2	-2.34	7 3.2					
7	12 5 53.91	0.560	1 0 56.3	3.07	9 2.9	7	12 4 8.50	0.281	1 4 15.1	-2.51	6 59.4					
8	12 5 40.78	0.534	1 2 7.7	2.90	8 58.8	8	12 4 15.57	0.308	1 3 12.8	-2.68	6 55.6					
9	12 5 28.27	0.508	1 3 15.0	2.72	8 54.7	9	12 4 23.27	0.334	1 2 6.4	-2.85	6 51.8					
10	12 5 16.38	0.482	1 4 18.0	2.54	8 50.5	10	12 4 31.61	0.360	1 0 55.8	-3.02	6 48.0					
11	12 5 5.12	-0.456	+1 5 16.7	+2.36	8 46.4	11	12 4 40.57	+0.386	+0 59 41.2	-3.19	6 44.2					
12	12 4 54.49	0.430	1 6 11.1	2.18	8 42.3	12	12 4 50.15	0.412	0 58 22.6	-3.36	6 40.5					
13	12 4 44.48	0.403	1 7 1.3	2.00	8 38.2	13	12 5 0.35	0.438	0 57 0.0	-3.52	6 36.7					
14	12 4 35.13	0.376	1 7 47.1	1.82	8 34.1	14	12 5 11.18	0.464	0 55 33.5	-3.69	6 33.0					
15	12 4 26.43	0.349	1 8 28.5	1.64	8 30.1	15	12 5 22.62	0.490	0 54 3.1	-3.85	6 29.2					
16	12 4 18.38	-0.322	+1 9 5.6	+1.46	8 26.0	16	12 5 34.67	+0.515	+0 52 28.7	-4.01	6 25.5					
17	12 4 10.98	0.295	1 9 38.3	1.27	8 21.9	17	12 5 47.33	0.540	0 50 50.4	-4.18	6 21.8					
18	12 4 4.24	0.267	1 10 6.6	1.09	8 17.9	18	12 6 0.61	0.565	0 49 8.2	-4.34	6 18.1					
19	12 3 58.15	0.239	1 10 30.5	0.91	8 13.9	19	12 6 14.48	0.590	0 47 22.2	-4.50	6 14.4					
20	12 3 52.72	0.211	1 10 50.1	0.72	8 9.9	20	12 6 28.94	0.615	0 45 32.3	-4.66	6 10.7					
21	12 3 47.95	-0.183	+1 11 5.2	+0.54	8 5.9	21	12 6 43.99	+0.640	+0 43 38.6	-4.82	6 7.0					
22	12 3 43.85	0.155	1 11 15.9	0.36	8 1.9	22	12 6 59.63	0.664	0 41 41.2	-4.97	6 3.3					
23	12 3 40.43	0.128	1 11 22.1	+0.17	7 57.9	23	12 7 15.85	0.688	0 39 40.2	-5.12	5 59.7					
24	12 3 37.68	0.100	1 11 23.9	-0.01	7 53.9	24	12 7 32.65	0.712	0 37 35.5	-5.27	5 56.0					
25	12 3 35.59	0.072	1 11 21.4	0.20	7 50.0	25	12 7 50.02	0.736	0 35 27.2	-5.42	5 52.4					
26	12 3 34.17	-0.045	+1 11 14.5	-0.38	7 46.0	26	12 8 7.95	+0.759	+0 33 15.3	-5.57	5 48.7					
27	12 3 33.41	-0.017	1 11 3.2	0.56	7 42.1	27	12 8 26.43	0.782	0 30 59.9	-5.72	5 45.1					
28	12 3 33.32	+0.011	1 10 47.4	0.74	7 38.1	28	12 8 45.46	0.805	0 28 41.1	-5.86	5 41.5					
29	12 3 33.89	0.038	1 10 27.4	0.92	7 34.2	29	12 9 5.05	0.827	0 26 18.8	-6.00	5 37.9					
30	12 3 35.12	0.066	1 10 3.0	1.10	7 30.3	30	12 9 25.17	0.849	0 23 53.0	-6.14	5 34.3					
31	12 3 37.01	+0.093	+1 9 34.3	-1.28	7 26.4	31	12 9 45.82	+0.871	+0 21 24.0	-6.28	5 30.7					
32	12 3 39.57	+0.120	+1 9 1.3	-1.46	7 22.5	32	12 10 7.00	+0.893	+0 18 51.7	-6.42	5 27.1					
Day of the Month.					8th.	16th.	24th.	Day of the Month.					1st.	9th.	17th.	25th.
Semidiameter . . . . .					20.0	19.6	19.1	Semidiameter . . . . .					18.7	18.3	17.9	17.5
Horizontal Parallax . . . . .					1.9	1.8	1.8	Horizontal Parallax . . . . .					1.8	1.7	1.7	1.6

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.

## GREENWICH MEAN TIME.

## JULY.

## AUGUST.

Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>	<i>h m</i>		<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>	<i>h m</i>
1	12 9 45.82	+0.871	+0.21 24.0	-6.28	5 30.7	1	12 24 21.68	+1.446	-1 19 56.1	-9.81	3 43.3
2	12 10 7.00	0.893	0 18 51.7	6.42	5 27.1	2	12 24 56.57	1.461	1 23 52.4	9.90	3 40.0
3	12 10 28.70	0.915	0 16 16.1	6.56	5 23.5	3	12 25 31.81	1.476	1 27 50.8	9.98	3 36.6
4	12 10 50.92	0.936	0 13 37.2	6.69	5 19.9	4	12 26 7.41	1.491	1 31 51.2	10.06	3 33.3
5	12 11 13.65	0.957	0 10 55.1	6.82	5 16.4	5	12 26 43.35	1.505	1 35 53.6	10.14	3 29.9
6	12 11 36.88	+0.978	+0 8 9.9	-6.95	5 12.8	6	12 27 19.63	+1.519	-1 39 58.0	-10.22	3 26.6
7	12 12 0.62	0.999	0 5 21.6	7.08	5 9.3	7	12 27 56.24	1.533	1 44 4.3	10.30	3 23.3
8	12 12 24.85	1.020	+0 2 30.2	7.21	5 5.8	8	12 28 33.19	1.547	1 48 12.5	10.38	3 20.0
9	12 12 49.57	1.040	-0 0 24.2	7.34	5 2.3	9	12 29 10.46	1.560	1 52 22.6	10.46	3 16.7
10	12 13 14.77	1.060	0 3 21.6	7.46	4 58.8	10	12 29 48.05	1.574	1 56 34.5	10.54	3 13.4
11	12 13 40.46	+1.080	-0 6 22.1	-7.59	4 55.3	11	12 30 25.96	+1.587	-2 0 48.2	-10.61	3 10.1
12	12 14 6.63	1.100	0 9 25.7	7.71	4 51.8	12	12 31 4.20	1.600	2 5 3.8	10.68	3 6.8
13	12 14 33.26	1.119	0 12 32.2	7.83	4 48.3	13	12 31 42.74	1.613	2 9 21.0	10.75	3 3.5
14	12 15 0.36	1.139	0 15 41.5	7.95	4 44.8	14	12 32 21.58	1.625	2 13 39.9	10.82	3 0.2
15	12 15 27.93	1.158	0 18 53.7	8.07	4 41.3	15	12 33 0.72	1.637	2 18 0.5	10.89	2 56.9
16	12 15 55.95	+1.177	-0 22 8.7	-8.18	4 37.8	16	12 33 40.15	+1.649	-2 22 22.7	-10.96	2 53.7
17	12 16 24.42	1.196	0 25 26.4	8.30	4 34.4	17	12 34 19.88	1.661	2 26 46.5	11.03	2 50.4
18	12 16 53.34	1.214	0 28 46.8	8.41	4 30.9	18	12 34 59.89	1.673	2 31 11.8	11.09	2 47.1
19	12 17 22.70	1.232	0 32 10.0	8.52	4 27.5	19	12 35 40.17	1.684	2 35 38.6	11.15	2 43.8
20	12 17 52.49	1.250	0 35 35.8	8.62	4 24.0	20	12 36 20.73	1.695	2 40 6.9	11.21	2 40.6
21	12 18 22.70	+1.268	-0 39 4.2	-8.73	4 20.6	21	12 37 1.56	+1.706	-2 44 36.6	-11.26	2 37.3
22	12 18 53.34	1.286	0 42 35.2	8.83	4 17.2	22	12 37 42.65	1.717	2 49 7.6	11.32	2 34.0
23	12 19 24.41	1.303	0 46 8.7	8.94	4 13.8	23	12 38 23.99	1.728	2 53 39.9	11.38	2 30.8
24	12 19 55.88	1.320	0 49 44.7	9.05	4 10.4	24	12 39 5.59	1.738	2 58 13.5	11.43	2 27.6
25	12 20 27.75	1.336	0 53 23.1	9.15	4 7.0	25	12 39 47.43	1.749	3 2 48.4	11.48	2 24.3
26	12 21 0.02	+1.353	-0 57 3.8	-9.25	4 3.6	26	12 40 29.51	+1.759	-3 7 24.5	-11.53	2 21.1
27	12 21 32.69	1.369	1 0 46.9	9.35	4 0.2	27	12 41 11.83	1.769	3 12 1.8	11.58	2 17.9
28	12 22 5.74	1.385	1 4 32.3	9.44	3 56.8	28	12 41 54.40	1.779	3 16 40.2	11.63	2 14.7
29	12 22 39.17	1.401	1 8 19.9	9.54	3 53.4	29	12 42 37.18	1.788	3 21 19.8	11.67	2 11.4
30	12 23 12.97	1.416	1 12 9.8	9.63	3 50.0	30	12 43 20.18	1.797	3 26 0.4	11.71	2 8.2
31	12 23 47.14	+1.431	-1 16 1.9	-9.72	3 46.7	31	12 44 3.40	+1.806	-3 30 42.0	-11.76	2 5.0
32	12 24 21.68	+1.446	-1 19 56.1	-9.81	3 43.3	32	12 44 46.85	+1.815	-3 35 24.6	-11.80	2 1.8

Day of the Month.	8d.	11th.	18th.	27th.	Day of the Month.	4th.	12th.	20th.	28th.
Semidiameter . . . .	17.1	16.7	16.3	16.0	Semidiameter . . . .	15.7	15.5	15.3	15.1
Horizontal Parallax . .	1.6	1.6	1.5	1.5	Horizontal Parallax . .	1.5	1.5	1.4	1.4

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

SEPTEMBER.						OCTOBER.											
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.						
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.							
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m						
1	12 44 46.85	+1.815	-3 35 24.6	-11.80	2 1.8	1	13 7 49.45	+1.998	-6 1 48.3	-12.38	0 26.8						
2	12 45 30.51	1.824	3 40 8.2	11.84	1 58.6	2	13 8 37.44	2.001	6 6 45.4	12.38	0 23.6						
3	12 46 14.37	1.833	3 44 52.8	11.88	1 55.4	3	13 9 25.52	2.005	6 11 42.5	12.37	0 20.5						
4	12 46 58.43	1.841	3 49 38.3	11.92	1 52.2	4	13 10 13.67	2.008	6 16 39.5	12.37	0 17.3						
5	12 47 42.68	1.849	3 54 24.7	11.95	1 49.0	5	13 11 1.89	2.011	6 21 36.4	12.36	0 14.2						
6	12 48 27.14	+1.857	-3 59 12.0	-11.99	1 45.8	6	13 11 50.18	+2.014	-6 26 33.1	-12.36	0 11.1						
7	12 49 11.79	1.865	4 4 0.1	12.02	1 42.6	7	13 12 38.53	2.016	6 31 29.6	12.35	0 8.0						
8	12 49 56.62	1.872	4 8 48.9	12.05	1 39.4	8	13 13 26.95	2.018	6 36 25.9	12.34	0 4.9						
9	12 50 41.64	1.880	4 13 38.5	12.08	1 36.2	9	13 14 15.41	2.020	6 41 21.9	12.33	0 1.8						
10	12 51 26.84	1.887	4 18 28.9	12.11	1 33.0	10	13 15 3.92	2.022	6 46 17.6	12.32	23 55.5						
11	12 52 12.21	+1.894	-4 23 19.9	-12.14	1 29.8	11	13 15 52.48	+2.024	-6 51 13.1	-12.30	23 52.3						
12	12 52 57.76	1.901	4 28 11.6	12.17	1 26.6	12	13 16 41.08	2.026	6 56 8.2	12.29	23 49.2						
13	12 53 43.48	1.908	4 33 3.9	12.19	1 23.5	13	13 17 29.71	2.027	7 1 2.9	12.27	23 46.1						
14	12 54 29.36	1.915	4 37 56.8	12.21	1 20.3	14	13 18 18.37	2.028	7 5 57.1	12.25	23 43.0						
15	12 55 15.39	1.922	4 42 50.2	12.23	1 17.2	15	13 19 7.07	2.029	7 10 50.9	12.23	23 39.8						
16	12 56 1.58	+1.928	-4 47 44.1	-12.25	1 14.0	16	13 19 55.79	+2.029	-7 15 44.2	-12.21	23 36.7						
17	12 56 47.92	1.934	4 52 38.5	12.27	1 10.9	17	13 20 44.51	2.030	7 20 36.9	12.18	23 33.6						
18	12 57 34.40	1.940	4 57 33.3	12.29	1 7.7	18	13 21 33.24	2.030	7 25 29.0	12.16	23 30.5						
19	12 58 21.01	1.946	5 2 28.5	12.31	1 4.6	19	13 22 21.98	2.031	7 30 20.6	12.14	23 27.3						
20	12 59 7.76	1.951	5 7 24.1	12.32	1 1.4	20	13 23 10.72	2.031	7 35 11.5	12.11	23 24.2						
21	12 59 54.64	+1.956	-5 12 20.0	-12.33	0 58.3	21	13 23 59.45	+2.030	-7 40 1.7	-12.08	23 21.1						
22	13 0 41.64	1.961	5 17 16.1	12.34	0 55.1	22	13 24 48.17	2.030	7 44 51.2	12.05	23 18.0						
23	13 1 28.76	1.966	5 22 12.4	12.35	0 52.0	23	13 25 36.88	2.029	7 49 40.0	12.02	23 14.8						
24	13 2 15.99	1.971	5 27 9.0	12.36	0 48.8	24	13 26 25.57	2.028	7 54 28.0	11.99	23 11.7						
25	13 3 3.33	1.975	5 32 5.8	12.37	0 45.7	25	13 27 14.23	2.027	7 59 15.2	11.95	23 8.6						
26	13 3 50.78	+1.979	-5 37 2.7	-12.37	0 42.5	26	13 28 2.86	+2.026	-8 4 1.6	-11.91	23 5.5						
27	13 4 38.33	1.983	5 41 59.7	12.38	0 39.4	27	13 28 51.46	2.025	8 8 47.1	11.88	23 2.3						
28	13 5 25.97	1.987	5 46 56.8	12.38	0 36.2	28	13 29 40.03	2.023	8 13 31.7	11.84	22 59.2						
29	13 6 13.71	1.991	5 51 54.0	12.39	0 33.1	29	13 30 28.55	2.021	8 18 15.4	11.80	22 56.1						
30	13 7 1.54	1.995	5 56 51.2	12.39	0 29.9	30	13 31 17.02	2.019	8 22 58.2	11.76	22 53.0						
31	13 7 49.45	+1.998	-6 1 48.3	-12.38	0 26.8	31	13 32 5.44	+2.017	-8 27 40.0	-11.72	22 49.9						
32	13 8 37.44	+2.001	-6 6 45.4	-12.38	0 23.6	32	13 32 53.81	+2.014	-8 32 20.8	-11.68	22 46.7						
Day of the Month.					5th.	15th.	25th.	29th.	Day of the Month.					7th.	15th.	25th.	31st.
Semidiameter . . . .					14.9	14.8	14.7	14.7	Semidiameter . . . .					14.6	14.6	14.6	14.7
Horizontal Parallax . .					1.4	1.4	1.4	1.4	Horizontal Parallax . .					1.4	1.4	1.4	1.4

NOTE.—The sign + indicates north declinations; the sign - indicates south declinations.



## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.											
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.						
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.							
	<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>	<i>h m</i>		<i>h m s</i>	<i>s</i>	<i>° ' "</i>	<i>"</i>	<i>h m</i>						
1	13 32 53.81	+2.014	8 32 20.8	-11.68	22 46.7	1	13 56 12.60	+1.835	-10 42 25.4	-9.81	21 11.9						
2	13 33 42.12	2.012	8 37 0.6	11.64	22 43.6	2	13 56 56.54	1.826	10 46 19.9	9.73	21 8.7						
3	13 34 30.36	2.009	8 41 39.3	11.60	22 40.5	3	13 57 40.24	1.816	10 50 12.5	9.65	21 5.5						
4	13 35 18.54	2.006	8 46 17.0	11.55	22 37.4	4	13 58 23.70	1.806	10 54 3.1	9.56	21 2.3						
5	13 36 6.65	2.003	8 50 53.6	11.50	22 34.2	5	13 59 6.91	1.795	10 57 51.6	9.48	20 59.0						
6	13 36 54.67	+2.000	8 55 29.0	-11.45	22 31.1	6	13 59 49.87	+1.784	-11 1 38.1	-9.40	20 55.8						
7	13 37 42.61	1.996	9 0 3.2	11.40	22 27.9	7	14 0 32.57	1.773	11 5 22.5	9.31	20 52.6						
8	13 38 30.46	1.992	9 4 36.1	11.35	22 24.8	8	14 1 14.99	1.762	11 9 4.8	9.22	20 49.4						
9	13 39 18.22	1.988	9 9 7.9	11.30	22 21.7	9	14 1 57.14	1.751	11 12 45.0	9.13	20 46.1						
10	13 40 5.87	1.983	9 13 38.4	11.24	22 18.6	10	14 2 39.01	1.739	11 16 23.1	9.04	20 42.9						
11	13 40 53.41	+1.979	9 18 7.5	-11.19	22 15.4	11	14 3 20.59	+1.727	-11 19 59.0	-8.95	20 39.6						
12	13 41 40.84	1.974	9 22 35.3	11.13	22 12.3	12	14 4 1.87	1.714	11 23 32.6	8.86	20 36.4						
13	13 42 28.16	1.969	9 27 1.7	11.07	22 9.1	13	14 4 42.84	1.701	11 27 3.9	8.76	20 33.1						
14	13 43 15.35	1.964	9 31 26.7	11.01	22 6.0	14	14 5 23.50	1.688	11 30 33.0	8.67	20 29.9						
15	13 44 2.41	1.958	9 35 50.2	10.95	22 2.8	15	14 6 3.84	1.674	11 33 59.8	8.57	20 26.6						
16	13 44 49.33	+1.952	9 40 12.3	-10.89	21 59.7	16	14 6 43.85	+1.660	-11 37 24.2	-8.47	20 23.4						
17	13 45 36.11	1.946	9 44 32.9	10.83	21 56.5	17	14 7 23.52	1.646	11 40 46.2	8.37	20 20.1						
18	13 46 22.73	1.940	9 48 51.9	10.76	21 53.3	18	14 8 2.86	1.632	11 44 5.9	8.27	20 16.8						
19	13 47 9.19	1.933	9 53 9.3	10.69	21 50.1	19	14 8 41.85	1.617	11 47 23.2	8.17	20 13.5						
20	13 47 55.50	1.926	9 57 25.0	10.63	21 47.0	20	14 9 20.48	1.602	11 50 38.0	8.07	20 10.2						
21	13 48 41.64	+1.919	-10 1 39.2	-10.56	21 43.8	21	14 9 58.75	+1.587	-11 53 50.3	-7.97	20 6.9						
22	13 49 27.60	1.911	10 5 51.7	10.49	21 40.6	22	14 10 36.66	1.571	11 57 0.1	7.86	20 3.6						
23	13 50 13.38	1.904	10 10 2.5	10.42	21 37.4	23	14 11 14.18	1.555	12 0 7.5	7.76	20 0.3						
24	13 50 58.99	1.896	10 14 11.7	10.35	21 34.3	24	14 11 51.32	1.539	12 3 12.3	7.65	19 57.0						
25	13 51 44.40	1.888	10 18 19.1	10.27	21 31.1	25	14 12 28.07	1.523	12 6 14.5	7.54	19 53.6						
26	13 52 29.61	+1.880	-10 22 24.7	-10.20	21 27.9	26	14 13 4.43	+1.506	-12 9 14.2	-7.43	19 50.3						
27	13 53 14.63	1.872	10 26 28.5	10.13	21 24.7	27	14 13 40.40	1.489	12 12 11.3	7.32	19 46.9						
28	13 53 59.45	1.863	10 30 30.5	10.05	21 21.5	28	14 14 15.95	1.472	12 15 5.8	7.21	19 43.6						
29	13 54 44.06	1.854	10 34 30.7	9.97	21 18.3	29	14 14 51.08	1.455	12 17 57.6	7.10	19 40.2						
30	13 55 28.44	1.845	10 38 29.0	9.89	21 15.1	30	14 15 25.79	1.438	12 20 46.8	6.99	19 36.9						
31	13 56 12.60	+1.833	-10 42 25.4	-9.81	21 11.9	31	14 16 0.08	+1.420	-12 23 33.3	-6.88	19 33.5						
32	13 56 56.54	+1.826	-10 46 19.9	-9.73	21 8.7	32	14 16 33.93	+1.402	-12 26 17.1	-6.77	19 30.1						
Day of the Month.					8th.	16th.	24th.	Day of the Month.					2d.	10th.	18th.	26th.	34th.
Semidiameter . . . . .					14.8	14.9	15.1	Semidiameter . . . . .					15.3	15.5	15.7	16.0	16.3
Horizontal Parallax . . . . .					1.4	1.4	1.4	Horizontal Parallax . . . . .					1.4	1.5	1.5	1.5	1.5

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

GREENWICH MEAN TIME.

JANUARY.						FEBRUARY.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	16 24 17.31	+1.108	-19 53 9.6	-2.46	21 36.5	1	16 36 14.10	+0.787	-20 16 47.3	-1.34	19 46.4
2	16 24 43.80	1.101	19 54 8.0	2.43	21 33.0	2	16 36 32.83	0.774	20 17 19.1	1.31	19 42.7
3	16 25 10.11	1.093	19 55 5.7	2.39	21 29.5	3	16 36 51.24	0.761	20 17 50.0	1.27	19 39.1
4	16 25 36.24	1.085	19 56 2.6	2.36	21 26.0	4	16 37 9.33	0.747	20 18 20.0	1.23	19 35.5
5	16 26 2.18	1.077	19 56 58.7	2.32	21 22.5	5	16 37 27.10	0.733	20 18 49.2	1.20	19 31.9
6	16 26 27.92	+1.069	-19 57 53.9	-2.29	21 19.0	6	16 37 44.53	+0.719	-20 19 17.5	-1.16	19 28.2
7	16 26 53.47	1.060	19 58 48.2	2.25	21 15.5	7	16 38 1.62	0.705	20 19 44.9	1.12	19 24.6
8	16 27 18.82	1.052	19 59 41.7	2.21	21 12.0	8	16 38 18.37	0.691	20 20 11.4	1.09	19 20.9
9	16 27 43.97	1.043	20 0 34.4	2.18	21 8.5	9	16 38 34.78	0.677	20 20 37.1	1.05	19 17.3
10	16 28 8.90	1.034	20 1 26.2	2.14	21 5.0	10	16 38 50.84	0.662	20 21 1.9	1.02	19 13.6
11	16 28 33.61	+1.025	-20 2 17.2	-2.11	21 1.4	11	16 39 6.55	+0.647	-20 21 25.8	-0.98	19 9.9
12	16 28 58.10	1.016	20 3 7.3	2.07	20 57.9	12	16 39 21.90	0.632	20 21 48.9	0.94	19 6.2
13	16 29 22.37	1.006	20 3 56.6	2.03	20 54.4	13	16 39 36.89	0.617	20 22 11.1	0.91	19 2.5
14	16 29 46.41	0.996	20 4 45.1	2.00	20 50.9	14	16 39 51.52	0.602	20 22 32.4	0.87	18 58.8
15	16 30 10.21	0.986	20 5 32.7	1.96	20 47.3	15	16 40 5.78	0.587	20 22 52.9	0.84	18 55.1
16	16 30 33.79	+0.976	-20 6 19.3	-1.93	20 43.8	16	16 40 19.67	+0.571	-20 23 12.5	-0.80	18 51.4
17	16 30 57.11	0.966	20 7 5.1	1.89	20 40.2	17	16 40 33.18	0.555	20 23 31.2	0.76	18 47.7
18	16 31 20.17	0.955	20 7 50.0	1.85	20 36.7	18	16 40 46.31	0.539	20 23 49.1	0.73	18 44.0
19	16 31 43.03	0.944	20 8 34.1	1.82	20 33.1	19	16 40 59.06	0.523	20 24 6.1	0.69	18 40.3
20	16 32 5.56	0.933	20 9 17.3	1.78	20 29.6	20	16 41 11.42	0.507	20 24 22.3	0.66	18 36.5
21	16 32 27.85	+0.922	-20 9 59.6	-1.75	20 26.0	21	16 41 23.40	+0.491	-20 24 37.6	-0.62	18 32.8
22	16 32 49.86	0.911	20 10 41.1	1.71	20 22.4	22	16 41 34.99	0.475	20 24 52.1	0.59	18 29.0
23	16 33 11.60	0.900	20 11 21.7	1.67	20 18.8	23	16 41 46.18	0.459	20 25 5.7	0.55	18 25.3
24	16 33 33.06	0.888	20 12 1.4	1.64	20 15.2	24	16 41 56.97	0.442	20 25 18.5	0.52	18 21.5
25	16 33 54.23	0.876	20 12 40.2	1.60	20 11.6	25	16 42 7.36	0.425	20 25 30.4	0.48	18 17.8
26	16 34 15.11	+0.864	-20 13 18.1	-1.57	20 8.0	26	16 42 17.35	+0.408	-20 25 41.5	-0.45	18 14.0
27	16 34 35.70	0.852	20 13 55.2	1.53	20 4.4	27	16 42 26.93	0.391	20 25 51.8	0.42	18 10.2
28	16 34 56.00	0.839	20 14 31.4	1.49	20 0.8	28	16 42 36.11	0.374	20 26 1.3	0.38	18 6.4
29	16 35 15.99	0.826	20 15 6.7	1.46	19 57.2	29	16 42 44.88	0.357	20 26 9.9	0.35	18 2.6
30	16 35 35.67	0.813	20 15 41.1	1.42	19 53.6	30	16 42 53.24	0.340	20 26 17.7	0.31	17 58.8
31	16 35 55.04	+0.800	-20 16 14.6	-1.38	19 50.0	31	16 43 1.19	+0.323	-20 26 24.7	-0.28	17 55.0
32	16 36 14.10	+0.787	-20 16 47.3	-1.34	19 46.4	32	16 43 8.73	+0.306	-20 26 30.9	-0.25	17 51.2

Day of the Month.	0d.	8th.	16th	24th.	Day of the Month.	1st.	9th.	17th.	25th.
Semidiameter . . . .	"	"	"	"	Semidiameter . . . .	"	"	"	"
Horizontal Parallax . .	7.2	7.3	7.3	7.4	Horizontal Parallax . .	7.5	7.6	7.7	7.8
	0.8	0.8	0.8	0.8		0.9	0.9	0.9	0.9

**NOTE.**—The sign + indicates north declinations; the sign — indicates south declinations.

## GREENWICH MEAN TIME.

MARCH						APRIL							
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m		
1	16 42 44.88	+0.357	20 26 9.9	-0.35	18 2.6	1	16 43 48.51	-0.186	20 24 9.6	+0.64	16 1.7		
2	16 42 53.24	0.340	20 26 17.7	0.31	17 58.8	2	16 43 43.83	0.203	20 23 54.1	0.66	15 57.7		
3	16 43 1.19	0.323	20 26 24.7	0.28	17 55.0	3	16 43 38.75	0.220	20 23 37.9	0.69	15 53.6		
4	16 43 8.73	0.306	20 26 30.9	0.25	17 51.2	4	16 43 33.27	0.237	20 23 21.0	0.72	15 49.6		
5	16 43 15.85	0.289	20 26 36.3	0.21	17 47.4	5	16 43 27.39	0.254	20 23 3.4	0.75	15 45.6		
6	16 43 22.56	+0.272	20 26 40.9	-0.18	17 43.6	6	16 43 21.10	-0.270	20 22 45.2	+0.78	15 41.5		
7	16 43 28.85	0.254	20 26 44.7	0.14	17 39.7	7	16 43 14.43	0.286	20 22 26.4	0.80	15 37.5		
8	16 43 34.73	0.236	20 26 47.7	0.11	17 35.9	8	16 43 7.37	0.302	20 22 6.9	0.83	15 33.4		
9	16 43 40.19	0.219	20 26 49.8	0.08	17 32.1	9	16 42 59.92	0.318	20 21 46.8	0.85	15 29.4		
10	16 43 45.23	0.201	20 26 51.2	0.04	17 28.2	10	16 42 52.09	0.334	20 21 26.0	0.88	15 25.3		
11	16 43 49.85	+0.184	20 26 51.8	-0.01	17 24.3	11	16 42 43.88	-0.350	20 21 4.7	+0.90	15 21.2		
12	16 43 54.04	0.166	20 26 51.6	+0.03	17 20.5	12	16 42 35.30	0.366	20 20 42.7	0.93	15 17.2		
13	16 43 57.81	0.148	20 26 50.6	0.06	17 16.6	13	16 42 26.34	0.381	20 20 20.1	0.96	15 13.1		
14	16 44 1.16	0.131	20 26 48.8	0.09	17 12.7	14	16 42 17.01	0.396	20 19 56.9	0.98	15 9.0		
15	16 44 4.08	0.113	20 26 46.3	0.12	17 8.8	15	16 42 7.31	0.411	20 19 33.1	1.00	15 4.9		
16	16 44 6.57	+0.095	20 26 43.0	+0.15	17 4.9	16	16 41 57.26	-0.426	20 19 8.8	+1.02	15 0.8		
17	16 44 8.63	0.077	20 26 39.0	0.18	17 1.0	17	16 41 46.86	0.441	20 18 43.9	1.04	14 56.7		
18	16 44 10.27	0.059	20 26 34.1	0.21	16 57.1	18	16 41 36.11	0.455	20 18 18.4	1.07	14 52.6		
19	16 44 11.48	0.041	20 26 28.5	0.25	16 53.2	19	16 41 25.00	0.469	20 17 52.4	1.09	14 48.5		
20	16 44 12.26	0.023	20 26 22.2	0.28	16 49.3	20	16 41 13.56	0.483	20 17 25.9	1.12	14 44.3		
21	16 44 12.61	+0.005	20 26 15.2	+0.31	16 45.4	21	16 41 1.79	-0.497	20 16 58.8	+1.14	14 40.2		
22	16 44 12.53	-0.013	20 26 7.4	0.34	16 41.4	22	16 40 49.70	0.511	20 16 31.2	1.16	14 36.1		
23	16 44 12.03	0.030	20 25 58.8	0.37	16 37.5	23	16 40 37.28	0.524	20 16 3.2	1.18	14 31.9		
24	16 44 11.10	0.048	20 25 49.5	0.40	16 33.5	24	16 40 24.55	0.537	20 15 34.6	1.20	14 27.8		
25	16 44 9.74	0.065	20 25 39.5	0.43	16 29.6	25	16 40 11.51	0.550	20 15 5.5	1.22	14 23.6		
26	16 44 7.96	-0.083	20 25 28.8	+0.46	16 25.6	26	16 39 58.17	-0.562	20 14 35.9	+1.24	14 19.5		
27	16 44 5.76	0.100	20 25 17.4	0.49	16 21.6	27	16 39 44.53	0.574	20 14 5.9	1.26	14 15.3		
28	16 44 3.14	0.118	20 25 5.3	0.52	16 17.7	28	16 39 30.62	0.586	20 13 35.5	1.28	14 11.1		
29	16 44 0.10	0.135	20 24 52.4	0.55	16 13.7	29	16 39 16.43	0.597	20 13 4.6	1.30	14 7.0		
30	16 43 56.64	0.152	20 24 38.8	0.58	16 9.7	30	16 39 1.96	0.608	20 12 33.3	1.32	14 2.8		
31	16 43 52.78	-0.169	20 24 24.5	+0.61	16 5.7	31	16 38 47.23	-0.619	20 12 1.6	+1.34	13 58.6		
32	16 43 48.51	-0.186	20 24 9.6	+0.64	16 1.7	32	16 38 32.25	-0.630	20 11 29.5	+1.35	13 54.4		
Day of the Month.			5th.	13th.	21st.	29th.	Day of the Month.			6th.	14th.	22d.	30th.
Semidiameter . . . .			7.9	8.0	8.1	8.2	Semidiameter . . . .			8.3	8.4	8.5	8.6
Horizontal Parallax . .			0.9	0.9	0.9	0.9	Horizontal Parallax . .			0.9	0.9	1.0	1.0

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

MAY.						JUNE.						
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.		
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m	
1	16 38 47.23	-0.619	-20 12 1.6	+1.34	13 58.6	1	16 29 44.45	-0.780	-19 53 35.9	+1.33	11 47.7	
2	16 38 32.25	0.630	20 11 29.5	1.35	13 54.4	2	16 29 25.74	0.779	19 52 59.3	1.32	11 43.4	
3	16 38 17.02	0.640	20 10 57.0	1.37	13 50.3	3	16 29 7.07	0.777	19 52 22.9	1.31	11 39.2	
4	16 38 1.55	0.650	20 10 24.1	1.38	13 46.1	4	16 28 48.45	0.775	19 51 46.8	1.30	11 34.9	
5	16 37 45.84	0.659	20 9 50.9	1.40	13 41.9	5	16 28 29.87	0.773	19 51 10.8	1.49	11 30.7	
6	16 37 29.92	-0.668	-20 9 17.3	+1.41	13 37.7	6	16 28 11.34	-0.770	-19 50 35.0	+1.48	11 26.5	
7	16 37 13.78	0.677	20 8 43.4	1.42	13 33.5	7	16 27 52.89	0.767	19 49 59.4	1.47	11 22.2	
8	16 36 57.42	0.686	20 8 9.2	1.44	13 29.3	8	16 27 34.51	0.765	19 49 24.1	1.46	11 18.0	
9	16 36 40.86	0.694	20 7 34.7	1.45	13 25.1	9	16 27 16.20	0.759	19 48 49.1	1.45	11 13.8	
10	16 36 24.11	0.702	20 6 59.9	1.46	13 20.9	10	16 26 57.98	0.755	19 48 14.4	1.44	11 9.5	
11	16 36 7.18	-0.710	-20 6 24.8	+1.47	13 16.6	11	16 26 39.87	-0.750	-19 47 40.0	+1.43	11 5.3	
12	16 35 50.06	0.717	20 5 49.4	1.48	13 12.4	12	16 26 21.87	0.746	19 47 5.9	1.42	11 1.1	
13	16 35 32.77	0.724	20 5 13.8	1.49	13 8.2	13	16 26 3.99	0.741	19 46 32.2	1.40	10 56.9	
14	16 35 15.32	0.731	20 4 38.0	1.50	13 4.0	14	16 25 46.23	0.736	19 45 58.9	1.38	10 52.6	
15	16 34 57.72	0.737	20 4 2.0	1.50	12 59.8	15	16 25 28.62	0.731	19 45 26.0	1.36	10 48.4	
16	16 34 39.97	-0.743	-20 3 25.7	+1.51	12 55.5	16	16 25 11.15	-0.725	-19 44 53.6	+1.34	10 44.2	
17	16 34 22.08	0.748	20 2 49.3	1.52	12 51.3	17	16 24 53.83	0.719	19 44 21.6	1.32	10 40.0	
18	16 34 4.08	0.753	20 2 12.8	1.52	12 47.1	18	16 24 36.68	0.712	19 43 50.0	1.30	10 35.8	
19	16 33 45.97	0.757	20 1 36.1	1.52	12 42.8	19	16 24 19.71	0.704	19 43 18.9	1.28	10 31.6	
20	16 33 27.74	0.761	20 0 59.3	1.53	12 38.6	20	16 24 2.92	0.696	19 42 48.4	1.26	10 27.4	
21	16 33 9.42	-0.765	-20 0 22.4	+1.53	12 34.4	21	16 23 46.30	-0.688	-19 42 18.4	+1.24	10 23.2	
22	16 32 51.02	0.768	19 59 45.4	1.54	12 30.1	22	16 23 29.89	0.680	19 41 49.0	1.22	10 19.0	
23	16 32 32.54	0.771	19 59 8.4	1.54	12 25.9	23	16 23 13.70	0.671	19 41 20.1	1.20	10 14.8	
24	16 32 13.99	0.773	19 58 31.4	1.54	12 21.6	24	16 22 57.72	0.662	19 40 51.8	1.17	10 10.6	
25	16 31 55.38	0.775	19 57 54.4	1.54	12 17.4	25	16 22 41.95	0.652	19 40 24.1	1.14	10 6.4	
26	16 31 36.73	-0.777	-19 57 17.3	+1.54	12 13.2	26	16 22 26.42	-0.642	-19 39 57.0	+1.11	10 2.2	
27	16 31 18.05	0.779	19 56 40.2	1.54	12 8.9	27	16 22 11.13	0.632	19 39 30.6	1.09	9 58.0	
28	16 30 59.35	0.781	19 56 3.2	1.54	12 4.7	28	16 21 56.08	0.622	19 39 4.9	1.06	9 53.8	
29	16 30 40.62	0.782	19 55 26.3	1.53	12 0.4	29	16 21 41.28	0.611	19 38 39.8	1.03	9 49.6	
30	16 30 21.89	0.782	19 54 49.4	1.53	11 56.2	30	16 21 26.73	0.600	19 38 15.5	1.00	9 45.5	
31	16 30 3.17	-0.781	-19 54 12.6	+1.53	11 51.9	31	16 21 12.46	-0.589	-19 37 51.9	+0.97	9 41.3	
32	16 29 44.45	-0.780	-19 53 35.9	+1.53	11 47.7	32	16 20 58.46	-0.578	-19 37 28.9	+0.94	9 37.1	
Day of the Month.					8th.	16th.	24th.	Day of the Month.				
					"	"	"					
Semidiameter . . . . .					8.6	8.7	8.7	Semidiameter . . . . .				
Horizontal Parallax . . . . .					1.0	1.0	1.0	Horizontal Parallax . . . . .				

## GREENWICH MEAN TIME.

JULY.						AUGUST.					
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m
1	16 21 12.46	-0.589	-19 37 51.9	+0.97	9 41.3	1	16 16 29.98	-0.142	-19 32 45.6	-0.21	7 34.8
2	16 20 58.46	0.578	19 37 28.9	0.94	9 37.1	2	16 16 26.76	0.123	19 32 51.2	0.23	7 30.8
3	16 20 44.73	0.566	19 37 6.6	0.91	9 33.0	3	16 16 23.93	0.109	19 32 57.9	0.29	7 26.8
4	16 20 31.28	0.554	19 36 45.1	0.88	9 28.8	4	16 16 21.50	0.092	19 33 5.6	0.33	7 22.8
5	16 20 18.12	0.542	19 36 24.5	0.85	9 24.7	5	16 16 19.47	0.076	19 33 14.3	0.38	7 18.9
6	16 20 5.26	-0.530	-19 36 4.6	+0.81	9 20.5	6	16 16 17.84	-0.060	-19 33 24.1	-0.42	7 14.9
7	16 19 52.69	0.517	19 35 45.5	0.78	9 16.4	7	16 16 16.61	0.043	19 33 34.9	0.47	7 11.0
8	16 19 40.42	0.504	19 35 27.2	0.75	9 12.3	8	16 16 15.79	0.026	19 33 46.7	0.51	7 7.0
9	16 19 28.47	0.491	19 35 9.8	0.71	9 8.1	9	16 16 15.37	-0.009	19 33 59.5	0.55	7 3.1
10	16 19 16.83	0.478	19 34 53.2	0.68	9 4.0	10	16 16 15.35	+0.008	19 34 13.4	0.60	6 59.2
11	16 19 5.51	-0.465	-19 34 37.5	+0.64	8 59.9	11	16 16 15.74	+0.025	-19 34 28.3	-0.64	6 55.2
12	16 18 54.51	0.451	19 34 22.6	0.61	8 55.8	12	16 16 16.53	0.042	19 34 44.3	0.68	6 51.3
13	16 18 43.85	0.437	19 34 8.6	0.57	8 51.7	13	16 16 17.73	0.059	19 35 1.3	0.72	6 47.4
14	16 18 33.53	0.423	19 33 55.6	0.53	8 47.6	14	16 16 19.34	0.076	19 35 19.3	0.76	6 43.5
15	16 18 23.55	0.409	19 33 43.5	0.49	8 43.5	15	16 16 21.36	0.092	19 35 38.3	0.81	6 39.6
16	16 18 13.92	-0.394	-19 33 32.3	+0.45	8 39.4	16	16 16 23.78	+0.109	-19 35 58.2	-0.85	6 35.7
17	16 18 4.64	0.379	19 33 22.0	0.41	8 35.3	17	16 16 26.61	0.126	19 36 19.2	0.89	6 31.8
18	16 17 55.70	0.364	19 33 12.7	0.37	8 31.2	18	16 16 29.85	0.143	19 36 41.2	0.93	6 28.0
19	16 17 47.11	0.349	19 33 4.3	0.33	8 27.1	19	16 16 33.50	0.160	19 37 4.2	0.97	6 24.1
20	16 17 38.90	0.334	19 32 56.8	0.29	8 23.1	20	16 16 37.55	0.177	19 37 28.2	1.02	6 20.2
21	16 17 31.06	-0.319	-19 32 50.3	+0.25	8 19.0	21	16 16 42.01	+0.194	-19 37 53.1	-1.06	6 16.4
22	16 17 23.59	0.304	19 32 44.9	0.21	8 15.0	22	16 16 46.87	0.211	19 38 19.0	1.10	6 12.5
23	16 17 16.50	0.288	19 32 40.5	0.17	8 10.9	23	16 16 52.14	0.228	19 38 45.9	1.14	6 8.7
24	16 17 9.80	0.272	19 32 37.0	0.13	8 6.9	24	16 16 57.81	0.245	19 39 13.8	1.18	6 4.8
25	16 17 3.47	0.256	19 32 34.5	0.09	8 2.9	25	16 17 3.88	0.261	19 39 42.6	1.22	6 1.0
26	16 16 57.52	-0.240	-19 32 33.1	+0.04	7 58.8	26	16 17 10.35	+0.278	-19 40 12.3	-1.26	5 57.2
27	16 16 51.95	0.224	19 32 32.7	0.00	7 54.8	27	16 17 17.21	0.294	19 40 43.0	1.30	5 53.4
28	16 16 46.77	0.208	19 32 33.2	-0.04	7 50.8	28	16 17 24.47	0.311	19 41 14.6	1.34	5 49.6
29	16 16 41.98	0.191	19 32 34.8	0.08	7 46.8	29	16 17 32.12	0.327	19 41 47.1	1.38	5 45.8
30	16 16 37.58	0.175	19 32 37.4	0.12	7 42.8	30	16 17 40.16	0.343	19 42 20.5	1.41	5 42.0
31	16 16 33.58	-0.158	-19 32 41.0	-0.07	7 38.8	31	16 17 48.59	+0.359	-19 42 54.7	-1.45	5 38.2
32	16 16 29.98	-0.142	-19 32 45.6	-0.21	7 34.8	32	16 17 57.41	+0.375	-19 43 29.8	-1.48	5 34.4
Day of the Month.		8d.	11th.	19th.	27th.	Day of the Month.		4th.	12th.	20th.	28th.
Semidiameter . . . .		8.5	8.4	8.4	8.3	Semidiameter . . . .		8.2	8.1	7.9	7.8
Horizontal Parallax . .		1.0	1.0	0.9	0.9	Horizontal Parallax . .		0.9	0.9	0.9	0.9

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

NOTE.—The sign + indicates north declinations: the sign — indicates south declinations.

## GREENWICH MEAN TIME.

NOVEMBER.						DECEMBER.							
Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.	Day of Month.	Apparent Right Ascension.	Var. of R. A. for 1 Hour.	Apparent Declination.	Var. of Decl. for 1 Hour.	Meridian Passage.		
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.			
	h m s	s	° ' "	"	h m		h m s	s	° ' "	"	h m		
1	16 37 21.06	+1.123	-20 37 39.5	-2.55	1 53.9	1	16 51 47.60	+1.255	-21 6 48.2	-2.23	0 10.3		
2	16 37 48.08	1.130	20 38 40.7	2.55	1 50.4	2	16 52 17.72	1.256	21 7 41.6	2.21	0 6.9		
3	16 38 15.27	1.137	20 39 41.8	2.55	1 46.9	3	16 52 47.87	1.257	21 8 34.5	2.19	0 3.5		
4	16 38 42.64	1.144	20 40 42.9	2.54	1 43.5	4	16 53 18.05	1.257	21 9 26.9	2.17	0 0.0		
5	16 39 10.18	1.151	20 41 43.9	2.54	1 40.0	5	16 53 48.25	1.258	21 10 18.8	2.15	23 53.1		
6	16 39 37.87	+1.157	-20 42 44.7	-2.54	1 36.5	6	16 54 18.47	+1.258	-21 11 10.3	-2.13	23 49.7		
7	16 40 5.70	1.163	20 43 45.4	2.53	1 33.0	7	16 54 48.70	1.259	21 12 1.3	2.11	23 46.3		
8	16 40 33.68	1.169	20 44 46.0	2.53	1 29.6	8	16 55 18.94	1.259	21 12 51.8	2.09	23 42.9		
9	16 41 1.82	1.175	20 45 46.4	2.52	1 26.1	9	16 55 49.17	1.259	21 13 41.9	2.07	23 39.4		
10	16 41 30.09	1.181	20 46 46.6	2.52	1 22.6	10	16 56 19.40	1.258	21 14 31.5	2.05	23 36.0		
11	16 41 58.50	+1.187	-20 47 46.6	-2.51	1 19.1	11	16 56 49.62	+1.258	-21 15 20.6	-2.03	23 32.6		
12	16 42 27.05	1.192	20 48 46.4	2.50	1 15.7	12	16 57 19.83	1.257	21 16 9.2	2.01	23 29.2		
13	16 42 55.72	1.197	20 49 46.0	2.49	1 12.2	13	16 57 50.01	1.257	21 16 57.2	1.99	23 25.7		
14	16 43 24.51	1.202	20 50 45.4	2.48	1 8.8	14	16 58 20.17	1.256	21 17 44.7	1.97	23 22.3		
15	16 43 53.42	1.207	20 51 44.5	2.47	1 5.3	15	16 58 50.30	1.255	21 18 31.7	1.95	23 18.9		
16	16 44 22.45	+1.212	-20 52 43.4	-2.46	1 1.9	16	16 59 20.39	+1.255	-21 19 18.2	-1.93	23 15.5		
17	16 44 51.57	1.216	20 53 42.0	2.44	0 58.4	17	16 59 50.44	1.251	21 20 4.1	1.91	23 12.0		
18	16 45 20.79	1.220	20 54 40.3	2.43	0 55.0	18	17 0 20.44	1.249	21 20 49.5	1.88	23 8.6		
19	16 45 50.11	1.224	20 55 38.4	2.42	0 51.5	19	17 0 50.39	1.247	21 21 34.3	1.86	23 5.1		
20	16 46 19.52	1.228	20 56 36.2	2.40	0 48.1	20	17 1 20.28	1.244	21 22 18.6	1.83	23 1.7		
21	16 46 49.02	+1.232	-20 57 33.6	-2.39	0 44.7	21	17 1 50.10	+1.241	-21 23 2.3	-1.81	22 58.2		
22	16 47 18.59	1.235	20 58 30.7	2.37	0 41.3	22	17 2 19.86	1.238	21 23 45.4	1.78	22 54.8		
23	16 47 48.23	1.238	20 59 27.5	2.36	0 37.8	23	17 2 49.55	1.235	21 24 28.0	1.76	22 51.4		
24	16 48 17.95	1.241	21 0 23.9	2.35	0 34.4	24	17 3 19.15	1.232	21 25 10.0	1.74	22 47.9		
25	16 48 47.74	1.243	21 1 20.0	2.33	0 31.0	25	17 3 48.67	1.228	21 25 51.4	1.72	22 44.5		
26	16 49 17.59	+1.245	-21 2 15.7	-2.32	0 27.5	26	17 4 18.11	+1.224	-21 26 32.3	-1.70	22 41.1		
27	16 49 47.49	1.247	21 3 11.0	2.30	0 24.1	27	17 4 47.46	1.220	21 27 12.6	1.67	22 37.6		
28	16 50 17.45	1.249	21 4 5.9	2.28	0 20.6	28	17 5 16.70	1.216	21 27 52.3	1.65	22 34.2		
29	16 50 47.46	1.251	21 5 0.4	2.27	0 17.2	29	17 5 45.84	1.212	21 28 31.4	1.62	22 30.7		
30	16 51 17.51	1.253	21 5 54.5	2.25	0 13.8	30	17 6 14.88	1.208	21 29 9.9	1.59	22 27.3		
31	16 51 47.60	+1.255	-21 6 48.2	-2.23	0 10.3	31	17 6 43.81	+1.203	-21 29 47.8	-1.57	22 23.8		
32	16 52 17.72	+1.256	-21 7 41.6	-2.21	0 6.9	32	17 7 12.62	+1.198	-21 30 25.1	-1.54	22 20.3		
Day of the Month.			8th.	16th.	24th.	Day of the Month.			2d.	10th.	18th.	26th.	34th.
Semidiameter . . . . .			7.2	7.1	7.1	Semidiameter . . . . .			7.1	7.1	7.1	7.1	7.2
Horizontal Parallax . . . . .			0.8	0.8	0.8	Horizontal Parallax . . . . .			0.8	0.8	0.8	0.8	0.8

The sign + prefixed to the hourly change of declination indicates that north declinations are increasing and south declinations are decreasing. The sign - indicates that north declinations are decreasing and south declinations increasing.

## GREENWICH MEAN TIME.

Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.	Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
Jan. 4	h m s	s	° ' "	"	h m	July 3	h m s	s	° ' "	"	h m
8	15 59 13.13	+12.451	-20 22 30.7	-35.95	20 59.5	7	15 51 27.53	-6.856	-20 0 26.6	+19.98	9 3.8
12	16 0 1.83	11.891	20 24 50.8	34.09	20 44.5	11	15 51 1.39	6.205	19 59 10.5	18.02	8 47.6
16	16 0 48.20	11.288	20 27 3.3	32.15	20 29.6	15	15 50 37.94	5.515	19 58 2.6	15.92	8 31.5
20	16 1 32.08	10.645	20 29 7.9	30.11	20 14.6	19	15 50 17.32	4.787	19 57 3.3	13.70	8 15.5
24	16 2 13.30	9.958	20 31 4.1	28.00	19 59.5	23	15 49 59.69	4.023	19 56 13.2	11.35	7 59.5
28	16 2 51.69	+9.231	-20 32 51.8	-25.81	19 44.4	27	15 49 45.17	-3.232	-19 55 32.6	+8.02	7 43.5
Feb. 1	16 3 27.10	8.469	20 34 30.5	23.53	19 29.3	31	15 49 33.86	2.419	19 55 1.9	6.41	7 27.6
5	16 3 59.40	7.677	20 36 0.0	21.24	19 14.1	Aug. 4	15 49 25.84	1.591	19 54 41.4	3.85	7 11.7
9	16 4 28.48	6.860	20 37 20.4	18.92	18 58.8	8	15 49 21.15	-0.732	19 54 31.2	+1.24	6 55.9
13	16 4 54.25	6.023	20 38 31.3	16.32	18 43.5	12	15 49 19.84	+0.097	19 54 31.5	-1.40	6 40.2
17	16 5 16.63	+5.161	-20 39 32.5	-14.10	18 28.1	16	15 49 21.94	+0.954	-19 54 42.4	-4.05	6 24.5
21	16 5 35.51	4.277	20 40 24.1	11.65	18 12.7	20	15 49 27.48	1.817	19 55 3.9	6.73	6 8.8
25	16 5 50.82	3.576	20 41 5.7	9.18	17 57.2	24	15 49 36.48	2.682	19 55 36.2	9.30	5 53.3
Mar. 1	16 6 2.51	2.468	20 41 37.5	6.71	17 41.7	28	15 49 48.93	3.540	19 56 19.0	12.01	5 37.8
5	16 6 10.56	1.558	20 41 59.4	4.24	17 26.1	Sept. 1	15 50 4.78	4.384	19 57 12.2	14.37	5 22.3
9	16 6 14.98	+0.651	-20 42 11.4	-1.79	17 10.4	5	15 50 23.98	+5.213	-19 58 15.5	-17.09	5 6.9
13	16 6 15.78	-0.249	20 42 13.7	+0.65	16 54.7	9	15 50 46.46	6.028	19 59 28.8	19.54	4 51.6
17	16 6 13.00	1.141	20 42 6.2	3.07	16 38.9	13	15 51 12.17	6.827	20 0 51.7	21.90	4 36.3
21	16 6 6.67	2.021	20 41 49.2	5.44	16 23.1	17	15 51 41.05	7.610	20 2 23.9	24.19	4 21.0
25	16 5 56.85	2.887	20 41 22.7	7.79	16 7.2	21	15 52 13.02	8.370	20 4 5.1	26.38	4 5.8
29	16 5 43.61	-3.727	-20 40 47.0	+10.05	15 51.2	25	15 52 47.97	+9.101	-20 5 54.8	-28.44	3 50.6
Apr. 2	16 5 27.08	4.532	20 40 2.4	18.26	15 35.2	29	15 53 25.78	9.797	20 7 52.5	30.39	3 35.5
6	16 5 7.40	5.302	20 39 9.0	14.38	15 19.1	Oct. 3	15 54 6.30	10.459	20 9 57.8	32.21	3 20.5
10	16 4 44.72	6.031	20 38 7.5	16.39	15 3.0	7	15 54 49.41	11.093	20 12 10.0	33.88	3 5.5
14	16 4 19.21	6.717	20 36 58.0	18.32	14 46.8	11	15 55 35.00	11.695	20 14 28.7	35.43	2 50.5
18	16 3 51.04	-7.361	-20 35 41.1	+20.14	14 30.6	15	15 56 22.92	+12.260	-20 16 53.3	-36.86	2 35.6
22	16 3 20.39	7.954	20 34 17.0	21.85	14 14.4	19	15 57 13.03	12.787	20 19 23.4	38.14	2 20.7
26	16 2 47.48	8.492	20 32 46.5	23.40	13 58.1	23	15 58 5.16	13.270	20 21 58.2	39.24	2 5.8
30	16 2 12.54	8.962	20 31 10.0	24.80	13 41.8	27	15 58 59.13	13.708	20 24 37.1	40.20	1 51.0
May 4	16 1 35.85	9.370	20 29 28.3	26.04	13 25.5	31	15 59 54.76	14.100	20 27 19.5	40.99	1 36.2
8	16 0 57.66	-9.718	-20 27 41.9	+27.11	13 9.1	Nov. 4	16 0 51.87	+14.447	-20 30 4.8	-41.65	1 21.4
12	16 0 18.21	9.996	20 25 51.6	28.02	12 52.7	8	16 1 50.28	14.752	20 32 52.5	42.14	1 6.7
16	15 59 37.78	10.209	20 23 58.0	28.72	12 36.3	12	16 2 49.83	15.013	20 35 41.8	42.49	0 51.9
20	15 58 56.63	10.354	20 22 1.8	29.30	12 19.9	16	16 3 50.32	15.226	20 38 32.3	42.70	0 37.2
24	15 58 15.04	10.429	20 20 3.9	29.62	12 3.5	20	16 4 51.57	15.387	20 41 23.2	42.74	0 22.5
28	15 57 33.30	-10.427	-20 18 5.1	+29.73	11 47.1	24	16 5 53.34	+15.490	-20 44 14.0	-42.64	0 7.8
June 1	15 56 51.72	10.551	20 16 6.3	29.65	11 30.7	28	16 6 55.42	15.542	20 47 4.1	42.38	23 49.4
5	15 56 10.58	10.209	20 14 8.2	29.37	11 14.3	Dec. 2	16 7 57.61	15.546	20 49 52.9	42.00	23 34.7
9	15 55 30.13	10.004	20 12 11.6	28.89	10 57.9	6	16 8 59.72	15.501	20 52 39.9	41.47	23 20.0
13	15 54 50.63	9.736	20 10 17.4	28.19	10 41.5	10	16 10 1.55	15.408	20 55 24.5	40.81	23 5.3
17	15 54 12.33	-9.403	-20 8 26.4	+27.28	10 25.1	14	16 11 2.91	+15.262	-20 58 6.2	-40.05	22 50.6
21	15 53 35.49	9.007	20 6 39.4	26.18	10 8.8	18	16 12 3.57	15.058	21 0 44.7	39.15	22 35.9
25	15 53 0.36	8.547	20 4 57.2	24.89	9 52.5	22	16 13 3.30	14.800	21 3 19.2	38.11	22 21.1
29	15 52 27.19	8.031	20 3 20.5	23.41	9 36.2	26	16 14 1.90	14.490	21 5 49.4	36.98	22 6.4
July 3	15 51 56.18	7.465	20 1 50.1	21.76	9 20.0	30	16 14 59.16	14.133	21 8 14.9	35.74	21 51.6
7	15 51 27.53	-6.856	-20 0 26.6	+19.98	9 3.8	34	16 15 54.90	+13.729	-21 10 35.2	-34.40	21 36.8
	15 51 1.39	-6.205	-19 59 10.5	+18.02	8 47.6		16 16 48.93	+13.279	-21 12 50.0	-32.99	21 21.9

Greatest semidiameter,  
Least semidiameter,

May 24, 1<sup>st</sup> 88  
November 27, 1<sup>st</sup> 68

Greatest horizontal parallax,  
Least horizontal parallax,

May 24, 0<sup>th</sup> 49  
November 27, 0<sup>th</sup> 44



## GREENWICH MEAN TIME.

Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.	Month and Day.	Apparent Right Ascension.	Var. of R. A. for 1 Day.	Apparent Declination.	Var. of Decl. for 1 Day.	Meridian Passage.
	Noon.	Noon.	Noon.	Noon.			Noon.	Noon.	Noon.	Noon.	
Jan. 4	h m s	s	° ' "	"	h m	July 3	h m s	s	° ' "	"	h m
8	5 19 9.66	-6.565	+21 43 29.2	-4.81	10 20.9	7	5 29 44.23	+9.240	+21 58 54.2	+6.37	22 40.0
12	5 18 43.94	6.288	21 43 10.7	4.41	10 4.8	11	5 30 20.85	9.066	21 59 18.9	5.97	22 24.9
16	5 18 19.42	5.960	21 42 53.9	3.96	9 48.7	15	5 30 56.72	8.863	21 59 42.0	5.56	22 9.8
20	5 17 56.31	5.592	21 42 39.0	3.46	9 32.6	19	5 31 31.71	8.628	22 0 3.4	5.11	21 54.6
24	5 17 34.72	5.198	21 42 26.2	2.94	9 16.5	23	5 32 5.70	8.361	22 0 22.9	4.66	21 39.5
28	5 17 14.77	-4.771	+21 42 15.5	-2.99	9 0.4	27	5 32 38.56	+8.064	+22 0 40.7	+4.22	21 24.3
Feb. 1	5 16 56.60	4.306	21 42 7.1	1.80	8 44.4	31	5 33 10.17	7.737	22 0 56.7	3.79	21 9.1
5	5 16 40.36	3.815	21 42 1.1	1.30	8 28.4	Aug. 4	5 33 40.42	7.385	22 1 11.0	3.35	20 53.8
9	5 16 26.11	3.303	21 41 57.5	-0.57	8 12.4	8	5 34 9.22	7.009	22 1 23.5	2.90	20 38.6
13	5 16 13.96	2.771	21 41 56.5	+0.06	7 56.5	12	5 34 36.46	6.668	22 1 34.2	2.45	20 23.3
17	5 16 3.96	-2.221	+21 41 58.0	+0.71	7 40.6	16	5 35 2.05	+6.182	+22 1 43.1	+2.01	20 8.0
21	5 15 56.20	1.657	21 42 2.2	1.39	7 24.8	20	5 35 25.88	5.729	22 1 50.3	1.60	19 52.6
25	5 15 50.72	1.079	21 42 9.1	2.05	7 9.0	24	5 35 47.85	5.255	22 1 55.9	1.19	19 37.3
Mar. 1	5 15 47.58	-0.491	21 42 18.6	-2.70	6 53.2	28	5 36 7.89	4.760	22 1 59.8	0.77	19 21.8
5	5 15 46.79	+0.099	21 42 30.7	3.35	6 37.5	Sept. 1	5 36 25.91	4.250	22 2 2.1	+0.37	19 6.4
9	5 15 48.37	+0.689	+21 42 45.4	+3.97	6 21.8	5	5 36 41.87	+3.725	+22 2 2.8	-0.01	18 50.9
13	5 15 52.30	1.275	21 43 2.5	4.59	6 6.1	9	5 36 55.69	3.185	22 2 2.0	0.39	18 35.4
17	5 15 58.57	1.857	21 43 22.1	5.19	5 50.5	13	5 37 7.33	2.651	22 1 59.7	0.76	18 19.9
21	5 16 7.15	2.436	21 43 44.0	5.76	5 34.9	17	5 37 16.72	2.067	22 1 55.9	1.11	18 4.3
25	5 16 18.04	3.006	21 44 8.2	6.32	5 19.4	21	5 37 23.84	1.492	22 1 50.8	1.45	17 48.7
29	5 16 31.18	+3.562	+21 44 34.6	+6.82	5 3.8	25	5 37 28.64	+0.910	+22 1 44.3	-1.77	17 33.1
Apr. 2	5 16 46.52	4.104	21 45 2.8	7.47	4 48.3	29	5 37 31.12	+0.330	22 1 36.6	2.07	17 17.4
6	5 17 3.99	4.627	21 45 32.8	7.71	4 32.9	Oct. 3	5 37 31.28	-0.249	22 1 27.7	2.37	17 1.6
10	5 17 23.51	5.129	21 46 4.5	8.11	4 17.5	7	5 37 29.13	0.826	22 1 17.6	2.66	16 45.9
14	5 17 45.00	5.613	21 46 37.7	8.46	4 2.2	11	5 37 24.68	1.396	22 1 6.4	2.92	16 30.1
18	5 18 8.39	+6.076	+21 47 12.2	+8.77	3 46.9	15	5 37 17.97	-1.960	+22 0 54.2	-3.17	16 14.2
22	5 18 33.58	6.518	21 47 47.9	9.05	3 31.5	19	5 37 9.01	2.515	22 0 41.0	3.42	15 58.3
26	5 19 0.50	6.936	21 48 24.6	9.26	3 16.2	23	5 36 57.87	3.053	22 0 26.8	3.65	15 42.4
30	5 19 29.03	7.325	21 49 2.0	9.41	3 1.0	27	5 36 44.61	3.571	22 0 11.8	3.84	15 26.4
May 4	5 19 59.06	7.682	21 49 39.9	9.54	2 45.8	31	5 36 29.34	4.062	21 59 56.1	4.03	15 10.5
8	5 20 30.45	+8.011	+21 50 18.3	+9.62	2 30.5	Nov. 4	5 36 12.14	-4.533	+21 59 39.6	-4.21	14 54.4
12	5 21 3.11	8.314	21 50 56.9	9.66	2 15.3	8	5 35 53.11	4.977	21 59 22.4	4.37	14 38.4
16	5 21 36.92	8.587	21 51 35.6	9.65	2 0.2	12	5 35 32.36	5.392	21 59 4.6	4.50	14 22.3
20	5 22 11.77	8.833	21 52 14.1	9.60	1 45.1	16	5 35 10.02	5.774	21 58 46.4	4.60	14 6.2
24	5 22 47.54	9.046	21 52 52.4	9.52	1 29.9	20	5 34 46.22	6.118	21 58 27.8	4.70	13 50.1
28	5 23 24.10	+9.226	+21 53 30.3	+9.39	1 14.8	24	5 34 21.13	-6.422	+21 58 8.8	-4.77	13 34.0
June 1	5 24 1.31	9.371	21 54 7.5	9.20	0 59.6	28	5 33 54.90	6.685	21 57 49.6	4.81	13 17.8
5	5 24 39.03	9.485	21 54 43.9	9.00	0 44.5	Dec. 2	5 33 27.71	6.905	21 57 30.3	4.84	13 1.6
9	5 25 17.15	9.568	21 55 19.5	8.76	0 29.5	6	5 32 59.73	7.079	21 57 10.9	4.82	12 45.4
13	5 25 55.53	9.619	21 55 54.1	8.50	0 14.4	10	5 32 31.14	7.212	21 56 51.7	4.77	12 29.2
17	5 26 34.06	+9.640	+21 56 27.5	+8.20	23 55.5	14	5 32 2.10	-7.298	+21 56 32.7	-4.70	12 13.0
21	5 27 12.61	9.626	21 56 59.7	7.89	23 40.5	18	5 31 32.82	7.333	21 56 14.1	4.60	11 56.8
25	5 27 51.03	9.578	21 57 30.6	7.54	23 25.3	22	5 31 3.50	7.319	21 55 55.9	4.46	11 40.6
29	5 28 29.19	9.498	21 58 0.0	7.16	23 10.2	26	5 30 34.33	7.256	21 55 38.4	4.29	11 24.4
July 3	5 29 6.97	9.385	21 58 27.9	6.77	22 55.1	30	5 30 5.51	7.145	21 55 21.6	4.09	11 8.2
7	5 29 44.23	+9.240	+21 58 54.2	+6.37	22 40.0	34	5 29 37.23	-6.989	+21 55 5.7	-3.86	10 52.0
	5 30 20.85	+9.066	+21 59 18.9	+5.97	22 24.9		5 29 9.65		+21 54 50.7		10 35.8

Greatest semidiameter,  
Least semidiameter,

December 14, = 1".33  
June 13, = 1".25

Greatest horizontal parallax, December 14, = 0".31  
Least horizontal parallax, June 13, = 0".29

MERCURY.								
GREENWICH MEAN NOON.								
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Jan.	0 67 47 31.4	6 17 25.4	+ 8 31.9	+2 29 0.0	+43 17.7	9.4885616	9.8703743	9.8595364
	2 80 25 10.0	6 19 13.1	11 49.9	3 51 30.6	38 45.5	9.4881092	9.8498349	9.8415237
	4 93 0 22.2	6 14 59.4	12 51.8	5 2 25.1	31 49.0	9.4912419	9.8348284	9.8299257
	6 105 21 22.3	6 5 9.0	11 30.1	5 57 45.5	23 21.5	9.4976879	9.8269283	9.8258736
	8 117 17 56.7	5 50 47.2	8 11.3	6 35 31.8	14 25.0	9.5069272	9.8267213	9.8293629
	10 128 42 28.1	5 33 21.3	+ 3 42.6	+6 55 43.1	+ 5 54.1	9.5182978	9.8336330	9.8393277
	12 139 30 19.1	5 14 21.2	- 1 3.9	6 59 49.9	- 1 35.1	9.5311067	9.8462227	9.8540917
	14 149 39 41.5	4 55 3.6	5 26.3	6 50 15.6	7 45.6	9.5447143	9.8627157	9.8718956
	16 159 11 0.0	4 36 25.2	8 56.3	6 29 41.4	12 35.6	9.5585802	9.8814553	9.8912450
	18 168 6 13.0	4 19 2.5	11 20.5	6 0 42.4	16 12.1	9.5722789	9.9011377	9.9110324
	20 176 28 13.8	4 3 15.1	-12 36.8	+5 25 34.3	-18 46.6	9.5854928	9.9208482	9.9305217
	22 184 20 21.9	3 49 10.4	12 50.2	4 46 9.1	20 31.2	9.5979956	9.9400039	9.9492603
	24 191 46 3.7	3 36 48.2	12 9.8	4 3 55.5	21 36.8	9.6096342	9.9582658	9.9670026
	26 198 48 39.7	3 26 3.6	10 46.3	3 20 1.9	22 12.6	9.6203087	9.9754616	9.9836361
	28 205 31 19.0	3 16 50.3	8 50.1	2 35 19.9	22 26.2	9.6299591	9.9915254	9.9991307
	30 211 56 56.6	3 9 0.6	- 6 31.3	+1 50 28.2	-22 23.2	9.6385523	0.0064557	0.0135057
Feb.	1 218 8 12.5	3 2 27.3	3 59.1	1 5 55.5	22 7.8	9.6460741	0.0202880	0.0268088
	3 224 7 32.3	2 57 3.6	- 1 20.9	+0 22 3.2	21 43.2	9.6525211	0.0330760	0.0390980
	5 229 57 9.5	2 52 43.7	+ 1 16.5	-0 20 52.5	21 11.5	9.6578967	0.0448828	0.0504383
	7 235 39 6.6	2 49 22.9	3 47.5	1 2 39.0	20 34.2	9.6622083	0.0557721	0.0608923
	9 241 15 18.0	2 46 57.5	+ 6 7.0	-1 43 6.1	-19 52.2	9.6654633	0.0658054	0.0705196
	11 246 47 31.2	2 45 24.2	8 10.8	2 22 5.0	19 6.0	9.6676692	0.0750403	0.0793740
	13 252 17 28.3	2 44 41.2	9 56.0	2 59 27.3	18 15.6	9.6688317	0.0835271	0.0875042
	15 257 46 48.7	2 44 47.4	11 18.8	3 35 4.3	17 20.7	9.6689535	0.0913107	0.0949509
	17 263 17 10.6	2 45 42.5	12 16.6	4 8 46.7	16 20.8	9.6680349	0.0984288	0.1017487
	19 268 50 11.6	2 47 26.9	+12 47.6	-4 40 23.7	-15 15.1	9.6660736	0.1049129	0.1079251
	21 274 27 32.1	2 50 2.2	12 49.5	5 9 42.5	14 2.3	9.6630647	0.1107878	0.1135010
	23 280 10 55.5	2 53 30.2	12 21.0	5 36 27.6	12 41.1	9.6590015	0.1160674	0.1184880
	25 286 2 10.0	2 57 53.8	11 21.7	6 0 20.2	11 9.5	9.6538755	0.1207624	0.1228920
	27 292 3 10.6	3 3 17.0	9 51.4	6 20 57.4	9 25.4	9.6476801	0.1248733	0.1267051
Mar.	1 298 16 0.8	3 9 44.2	+ 7 50.9	-6 37 51.4	- 7 25.9	9.6404103	0.1283867	0.1299147
	3 304 42 53.4	3 17 20.4	5 23.0	6 50 28.6	5 8.0	9.6320673	0.1312851	0.1324937
	5 311 26 12.2	3 26 11.2	+ 2 31.7	6 58 8.9	- 2 28.3	9.6226624	0.1335344	0.1344015
	7 318 28 31.8	3 36 22.3	- 0 36.3	7 0 4.6	+ 0 37.2	9.6122240	0.1350871	0.1355832
	9 325 52 38.1	3 47 58.6	3 51.5	6 55 20.5	4 12.1	9.6008043	0.1358797	0.1359662
	11 333 41 25.7	4 1 4.1	- 7 0.8	-6 42 54.3	+ 8 19.8	9.5884929	0.1358300	0.1354579
	13 341 57 54.3	4 15 39.2	9 47.6	6 21 38.3	23 2.0	9.5754286	0.1348349	0.1339447
	15 350 44 59.4	4 31 39.6	11 51.2	5 50 24.1	18 17.4	9.5618192	0.1327693	0.1312900
	17 0 5 20.8	4 48 52.8	12 49.6	5 8 10.7	23 59.6	9.5479592	0.1294852	0.1273333
	19 10 1 3.6	5 6 55.6	12 23.7	4 14 17.1	29 54.4	9.5342471	0.1248119	0.1218968
	21 20 33 9.5	5 25 7.9	-10 19.4	-3 8 41.2	+35 36.9	9.5211972	0.1185642	0.1147899
	23 31 41 4.6	5 42 34.1	6 37.6	1 52 21.6	40 31.2	9.5094285	0.1105505	0.1058243
	25 43 22 6.8	5 58 1.6	- 1 41.3	-0 27 38.1	43 53.0	9.4996274	0.1005916	0.0948352
	27 55 30 55.7	6 10 6.4	+ 3 43.9	+1 1 38.7	44 57.8	9.4924729	0.0885421	0.0817039
	29 67 59 24.3	6 17 29.7	8 35.4	2 30 20.6	43 14.7	9.4885288	0.0743174	0.0663854
	31 80 37 6.5	6 19 12.0	+11 51.8	+3 52 42.7	+38 40.0	9.4881324	0.0579159	0.0489237
	33 93 12 10.4	6 14 52.4	+12 51.5	+5 3 24.3	+31 41.6	9.4913189	0.0394298	0.0294597

## MERCURY.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
	°	'	"			°	'	"			At Date.	At Intermediate Date.
Apr.	2	93	12 10.4	6 14 52.4	+12 51.5	+5 3 24.3	+31 41.6	9.4913189	0.0394298	0.0294597		
	4	105	32 51.8	6 4 57.4	11 27.7	5 58 28.8	23 13.2	9.4978126	0.0190444	0.0082196		
	6	117	28 59.2	5 50 31.9	8 7.4	6 35 58.5	14 17.0	9.5070902	9.9970240	9.9854997		
	8	128	52 57.8	5 33 4.4	+ 3 37.2	6 55 54.0	+ 5 46.6	9.5184882	9.9736908	9.9616435		
	10	139	40 14.5	5 14 3.2	- 1 9.7	6 59 46.6	- 1 41.4	9.5313142	9.9494064	9.9370288		
	12	149	48 59.6	4 54 45.1	- 5 30.6	+6 50 1.1	- 7 50.6	9.5449296	9.9245618	9.9120583		
	14	159	19 42.6	4 36 8.2	8 58.9	6 29 18.1	12 39.2	9.5587958	9.8995725	9.8871605		
	16	168	14 23.2	4 18 47.2	11 22.1	6 0 12.4	16 15.0	9.5724893	9.8748802	9.8627925		
	18	176	35 54.3	4 3 1.2	12 37.3	5 24 59.5	18 48.6	9.5856932	9.8509596	9.8394459		
	20	184	27 36.4	3 48 58.0	12 50.0	4 45 31.1	20 32.5	9.5981835	9.8283174	9.8176419		
	22	191	52 54.7	3 36 37.2	-12 8.8	+4 3 15.5	-21 37.5	9.6098075	9.8074882	9.7979241		
	24	198	55 10.6	3 25 54.4	10 44.6	3 19 20.8	22 13.0	9.6204660	9.7890161	9.7808291		
	26	205	37 32.9	3 16 42.5	8 48.0	2 34 38.2	22 26.2	9.6301001	9.7734231	9.7668531		
	28	212	2 56.0	3 8 53.9	6 29.1	1 49 46.8	22 22.9	9.6386766	9.7611659	9.7564004		
	30	218	13 59.4	3 2 21.7	3 56.6	1 5 14.6	22 7.5	9.6461815	9.7525882	9.7497386		
	May	2	224	13 9.2	2 56 59.1	- 1 18.4	+0 21 23.1	-21 42.8	9.6526115	9.7478664	9.7469640	
		4	230	2 38.4	2 52 40.2	+ 1 18.9	-0 21 31.6	21 11.0	9.6579706	9.7470145	9.7479904	
		6	235	44 29.4	2 49 20.3	3 49.7	1 3 17.0	20 33.6	9.6622654	9.7498556	9.7525660	
		8	241	20 36.3	2 46 55.5	6 9.1	1 43 42.8	19 51.5	9.6655041	9.7560706	9.7603138	
		10	246	52 46.3	2 45 23.1	8 12.9	2 22 40.2	19 5.2	9.6676937	9.7652375	9.7707826	
12		252	22 42.3	2 44 41.0	+ 9 57.5	-3 0 0.9	-18 14.8	9.6688400	9.7768883	9.7834957		
14		257	52 3.0	2 44 48.0	11 19.9	3 35 36.3	17 19.8	9.6689457	9.7905482	9.7979931		
16		263	22 26.6	2 45 43.7	12 17.3	4 9 16.8	16 19.9	9.6680111	9.8057806	9.8138625		
18		268	55 30.8	2 47 28.9	12 47.8	4 40 51.8	15 14.1	9.6660340	9.8221946	9.8307385		
20		274	32 56.0	2 50 4.9	12 49.3	5 10 8.4	14 1.2	9.6630090	9.8394585	9.8483220		
	22	280	16 25.7	2 53 33.8	+12 20.3	-5 36 51.0	-12 39.8	9.6589296	9.8573004	9.8663675		
	24	286	7 48.2	2 57 58.3	11 20.5	6 0 40.7	11 8.0	9.6537874	9.8755006	9.8846781		
	26	292	8 58.6	3 3 22.4	9 49.8	6 21 14.7	9 23.6	9.6475758	9.8938817	9.9030952		
	28	298	22 0.7	3 9 50.7	7 48.8	6 38 5.0	7 23.9	9.6402897	9.9123030	9.9214918		
	30	304	49 7.5	3 17 27.9	5 20.5	6 50 37.9	5 5.7	9.6319307	9.9306485	9.9397612		
	June	1	311	32 42.2	3 26 19.8	+ 2 28.9	-6 58 13.2	- 2 25.7	9.6225099	9.9488186	9.9578098	
		3	318	35 20.4	3 36 32.1	- 0 39.3	7 0 3.4	+ 0 40.1	9.6120563	9.9667245	9.9755514	
		5	325	59 47.7	3 48 9.8	3 54.5	6 55 12.8	4 15.6	9.6006225	9.9842800	9.9928990	
		7	333	48 59.3	4 1 16.7	7 3.6	6 42 39.0	8 23.9	9.5882985	0.0013967	0.0097601	
		9	342	5 54.4	4 15 53.2	9 49.8	6 21 14.3	13 6.6	9.5752243	0.0179763	0.0260303	
11		350	53 29.0	4 31 54.9	-11 52.6	-5 49 50.5	+18 22.5	9.5616088	0.0339066	0.0415892		
13		0 14 22.5	4 49 9.0	12 50.3	5 7 26.5	24 5.0	9.5477475	0.0490599	0.0562985			
15		10 10 37.9	5 7 12.0	12 22.5	4 13 22.1	29 59.8	9.5340414	0.0632841	0.0699949			
17		20 43 17.0	5 25 24.4	10 16.7	3 7 35.8	33 41.9	9.5210060	0.0764084	0.0825004			
19		31 51 44.0	5 42 49.3	6 33.6	1 51 7.2	40 35.2	9.5092621	0.0882465	0.0936229			
	21	43 33 14.3	5 58 14.3	- 1 36.4	-0 26 17.6	+43 55.1	9.4994965	0.0986055	0.1031731			
	23	55 42 25.1	6 20 15.3	+ 3 48.8	+1 3 1.2	44 57.4	9.4923869	0.1073050	0.1109841			
	25	68 11 8.0	6 17 33.4	8 39.3	2 31 39.9	43 11.8	9.4884948	0.1141965	0.1169325			
	27	80 48 52.1	6 19 10.5	11 53.8	3 53 53.5	38 34.6	9.4881536	0.1191869	0.1209589			
	29	93 23 48.2	6 14 45.8	12 51.3	5 4 22.5	31 34.3	9.4913933	0.1222532	0.1230775			
	31	105 44 11.2	6 4 46.0	+11 25.5	+5 59 11.3	+23 5.0	9.4979339	0.1234452	0.1233717			
	33	117 39 52.4	5 50 17.3	+ 8 3.7	+6 36 24.6	+14 8.8	9.5072489	0.1228761	0.1219789			

MERCURY.												
GREENWICH MEAN NOON.												
Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
												Date.
July	1	105	44 11.2	6 4 46.6	+11 25.5	+5 59 11.3	+25 5.0	9.4979339	0.1234452	0.1233717		
	3	117	39 52.4	5 50 17.3	8 3.7	6 36 24.6	24 8.8	9.5072489	0.1228761	0.1219789		
	5	129	3 19.2	5 38 47.3	+ 3 33.8	6 56 4.4	+ 5 39.3	9.5186738	0.1207023	0.1190692		
	7	139	50 0.0	5 13 45.4	- 1 12.6	6 59 43.7	- 1 47.6	9.5315162	0.1171024	0.1148242		
	9	149	58 10.9	4 54 28.0	5 33.7	6 49 46.7	7 55.6	9.5451391	0.1122562	0.1094192		
	11	159	28 20.7	4 35 51.9	- 9 1.6	+6 28 53.7	-12 43.2	9.5590054	0.1063325	0.1030141		
	13	168	22 29.8	4 18 31.9	11 23.7	5 59 42.4	16 17.7	9.5726935	0.0994797	0.0957444		
	15	176	43 32.3	4 2 47.5	12 38.0	5 24 24.8	18 50.4	9.5858882	0.0918220	0.0877241		
	17	184	34 48.6	3 48 45.9	12 49.7	4 44 53.2	20 33.7	9.5983663	0.0834612	0.0790431		
	19	191	59 44.3	3 36 26.8	12 7.8	4 2 35.7	21 38.2	9.6099762	0.0744775	0.0697716		
	21	199	1 40.8	3 25 45.3	-10 43.1	+3 18 39.8	-22 13.4	9.6206196	0.0649310	0.0599614		
	23	205	43 46.1	3 16 34.6	8 46.0	2 33 57.0	22 26.3	9.6302378	0.0548666	0.0496501		
	25	212	8 55.0	3 8 47.5	6 26.8	1 49 5.5	22 22.9	9.6387983	0.0443149	0.0388625		
	27	218	19 46.8	3 2 16.3	3 54.2	1 4 33.7	22 7.2	9.6462869	0.0332951	0.0276139		
	29	224	18 46.6	2 56 34.7	- 1 15.9	+0 20 43.0	22 42.3	9.6527008	0.0218195	0.0159120		
	31	230	8 8.0	2 58 36.7	+ 1 21.3	-0 22 10.8	-21 10.4	9.6580438	0.0098915	0.0037582		
Aug.	2	235	49 52.8	2 49 17.7	3 52.0	1 3 55.0	20 32.9	9.6623226	9.9975120	9.9911526		
	4	241	25 55.4	2 46 33.7	6 11.1	1 44 19.5	19 50.8	9.6655453	9.9846794	9.9780924		
	6	246	58 2.5	2 45 22.0	8 14.6	2 23 15.5	19 4.5	9.6677196	9.9713917	9.9645778		
	8	252	27 56.8	2 44 40.6	9 59.0	3 0 34.7	18 14.0	9.6688504	9.9576521	9.9506163		
	10	257	57 17.7	2 44 48.4	+11 20.9	-3 36 8.3	-17 18.9	9.6689404	9.9434722	9.9362240		
	12	263	27 42.8	2 45 44.8	12 17.9	4 9 47.0	16 18.9	9.6679904	9.9288770	9.9214382		
	14	269	0 50.0	2 47 30.8	12 48.0	4 41 19.9	15 13.0	9.6659976	9.9139159	9.9063217		
	16	274	38 19.8	2 50 7.5	12 49.1	5 10 34.2	14 0.0	9.6629570	9.8986695	9.8909774		
	18	280	21 55.3	2 53 37.1	12 19.8	5 37 14.3	12 38.5	9.6588620	9.8832661	9.8755621		
	20	286	13 25.4	2 58 2.6	+11 19.4	-6 1 1.3	-11 6.6	9.6537038	9.8678969	9.8603078		
	22	292	14 45.4	3 3 27.7	9 48.2	6 21 32.0	9 21.9	9.6474762	9.9528396	9.8455437		
	24	298	27 58.9	3 9 36.9	7 46.8	6 38 18.6	7 21.9	9.6401740	9.8384785	9.8317124		
	26	304	55 18.9	3 17 35.1	5 18.1	6 50 47.4	5 3.6	9.6317988	9.8253222	9.8193936		
	28	311	39 9.2	3 26 28.3	+ 2 26.1	6 58 18.3	- 2 22.9	9.6223622	9.8140194	9.8092989		
	30	318	42 5.3	3 36 41.7	- 0 42.2	-7 0 2.2	+ 0 43.4	9.6118933	9.8053366	9.8022405		
	Sept.	1	326	6 52.8	3 48 20.7	3 57.3	6 55 5.0	4 19.1	9.6004452	9.8001148	9.7990592	
3		333	56 27.5	4 1 28.9	7 6.4	6 42 23.7	8 27.8	9.5881085	9.7991637	9.8005001		
5		342	13 48.2	4 16 6.7	9 52.0	6 20 50.6	13 11.1	9.5750240	9.8031245	9.8070658		
7		351	1 51.0	4 32 9.5	11 54.1	5 49 17.2	18 27.5	9.5614017	9.8123273	9.8188835		
9		0 23 14.7	4 49 24.7	-12 50.6	-5 6 43.0	+24 10.2	9.5475390	9.8266813	9.8356406	9.8356406		
11		10 20 2.2	5 7 28.2	12 21.4	4 12 28.0	30 5.0	9.5338381	9.8456602	9.8566191	9.8566191		
13		20 53 13.5	5 23 40.3	10 14.0	3 6 31.4	35 46.8	9.5208167	9.8683837	9.8808107	9.8808107		
15		32 2 11.5	5 43 4.2	6 29.6	1 49 54.1	40 38.9	9.5090969	9.8937529	9.9070647	9.9070647		
17		43 44 9.5	5 58 26.8	- 1 31.5	-0 24 58.4	43 57.2	9.4993658	9.9206041	9.9342349	9.9342349		
19		55 53 42.1	6 10 24.7	+ 3 53.6	+1 4 22.2	+44 57.2	9.4923005	9.9478326	9.9612834	9.9612834		
21		68 22 38.3	6 17 38.2	8 43.1	2 32 57.7	43 8.9	9.4884599	9.9744856	9.9873522	9.9873522		
23		81 0 26.0	6 19 9.5	11 55.8	3 55 3.0	38 28.8	9.4881727	9.9998099	0.0117993	0.0117993		
25		93 35 14.8	6 14 40.0	12 51.1	5 5 19.2	31 27.3	9.4914649	0.0232753	0.0342027	0.0342027		
27		105 55 21.2	6 4 35.3	11 22.8	5 59 52.9	22 57.0	9.4980518	0.0445626	0.0543439	0.0543439		
29		117 50 37.0	5 50 3.0	+ 8 0.2	+6 36 50.1	+14 0.8	9.5074035	0.0635440	0.0721695	0.0721695		
31		129 13 33.1	5 32 32.2	+ 3 29.5	+6 56 14.6	+ 5 32.0	9.5188548	0.0802316	0.0877472	0.0877472		

## MERCURY.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—		
							At Date.	At Intermediate Date.	
Oct.	1	129 13 33.1	5 32 32.2	+ 3 29.5	+6 56 14.6	+ 5 32.0	9.5188548	0.0802316	0.0877472
	3	139 59 40.5	5 13 28.5	- 1 16.8	6 59 40.4	- 1 54.8	9.5317136	0.0947357	0.1012194
	5	150 7 17.6	4 54 11.6	5 37.3	6 49 32.2	8 0.7	9.5453440	0.1072218	0.1127666
	7	159 36 54.6	4 35 36.0	9 4.2	6 28 31.4	12 47.1	9.5592108	0.1178776	0.1225792
	9	168 30 33.2	4 18 17.3	11 25.4	5 59 12.5	16 20.4	9.5728937	0.1268947	0.1308449
	11	176 51 7.8	4 8 34.3	-12 38.6	+5 23 50.2	-18 32.5	9.5860795	0.1344500	0.1377297
	13	184 41 59.2	3 48 34.3	12 49.4	4 44 15.4	20 35.0	9.5985459	0.1407020	0.1433833
	15	192 6 33.3	3 36 16.8	12 6.7	4 1 55.8	22 39.0	9.6101422	0.1457892	0.1479335
	17	199 8 10.6	3 25 36.4	10 41.4	3 17 58.8	24 13.8	9.6207711	0.1498288	0.1514871
	19	205 49 59.6	3 16 27.0	8 44.0	2 33 15.5	26 26.4	9.6303741	0.1529187	0.1541327
	21	212 14 54.7	3 8 41.2	- 6 24.5	+1 48 24.1	-28 22.7	9.6389189	0.1551382	0.1559423
	23	218 25 34.8	3 8 11.0	3 51.9	1 3 52.8	22 6.9	9.6463917	0.1565517	0.1569723
	25	224 24 25.0	3 56 50.3	- 1 13.6	+0 20 2.7	21 41.9	9.6527899	0.1572093	0.1572672
	27	230 13 38.4	3 58 33.3	+ 1 23.8	-0 22 50.1	21 9.8	9.6581172	0.1571491	0.1568585
	29	235 55 17.4	3 49 13.2	3 54.2	1 4 33.1	20 32.4	9.6623806	0.1563974	0.1557675
	Nov.	31	241 31 15.7	3 46 52.0	+ 6 13.1	-1 44 56.4	-19 50.2	9.6655880	0.1549704
2		247 3 20.1	3 45 21.0	8 16.3	2 23 51.0	19 3.7	9.6677464	0.1528748	0.1515756
4		252 33 13.1	3 44 40.4	10 0.4	3 1 8.5	18 13.1	9.6688615	0.1501082	0.1484707
6		258 2 34.2	3 44 48.8	11 21.9	3 36 40.4	17 18.0	9.6689361	0.1466608	0.1446757
8		263 33 0.9	3 45 45.9	12 18.6	4 10 17.3	16 17.9	9.6679703	0.1425123	0.1401667
10		269 6 11.0	3 47 32.7	+12 48.3	-4 41 48.1	-15 11.9	9.6659617	0.1376349	0.1349116
12		274 43 45.6	3 50 10.3	12 48.8	5 11 0.2	13 58.8	9.6629052	0.1319913	0.1288683
14		280 27 27.4	3 53 40.7	12 19.0	5 37 37.7	12 37.1	9.6587938	0.1255362	0.1219868
16		286 19 5.3	3 58 7.0	11 18.3	6 1 21.7	11 5.0	9.6536193	0.1182125	0.1142050
18		292 20 35.0	3 3 33.0	9 46.5	6 21 49.2	9 20.2	9.6473752	0.1099547	0.1054514
20		298 34 0.1	3 10 3.2	+ 7 44.7	-6 38 32.2	- 7 20.0	9.6400565	0.1006844	0.0956425
22		305 1 33.8	3 17 42.7	5 15.6	6 50 56.6	5 1.2	9.6316648	0.0903130	0.0846827
24		311 45 40.3	3 26 36.9	+ 2 23.5	6 58 22.2	- 2 20.4	9.6222120	0.0787383	0.0724654
26		318 48 55.1	3 36 51.6	- 0 45.2	7 0 0.8	+ 0 46.4	9.6117274	0.0658487	0.0588732
28		326 14 4.0	3 48 32.1	4 0.3	6 54 57.0	4 22.7	9.6002645	0.0515238	0.0437853
Dec.		30	334 4 2.9	4 1 41.7	- 7 9.1	-6 42 8.0	+ 8 31.9	9.5879148	0.0356430
	2	342 21 50.5	4 16 20.7	9 54.2	6 20 26.2	13 15.7	9.5748200	0.0180956	0.0086712
	4	351 10 22.7	4 32 24.9	11 55.4	5 48 43.1	18 32.6	9.5611911	9.9988063	9.9885026
	6	0 32 18.5	4 49 41.2	12 50.8	5 5 58.3	24 15.7	9.5473271	9.9777704	9.9666306
	8	10 29 39.5	5 7 45.0	12 20.2	4 11 32.4	30 10.4	9.5336320	9.9551179	9.9432841
	10	21 3 24.4	5 25 57.0	-10 11.4	-3 5 25.4	+35 51.8	9.5206250	9.9312020	9.9189703
	12	32 12 54.8	5 43 19.6	6 25.4	1 48 39.0	40 42.8	9.5089297	9.9067168	9.8946022
	14	43 55 21.6	5 58 40.2	- 1 26.7	-0 23 37.3	45 59.2	9.4992340	9.8828202	9.8715979
	16	56 5 17.6	6 10 34.0	+ 3 57.4	+1 5 45.2	44 56.8	9.4922141	9.8611892	9.8518637
	18	68 34 26.7	6 17 42.1	8 47.2	2 34 17.4	43 5.8	9.4889256	9.8438937	9.8375293
	20	81 12 18.1	6 19 10.0	+11 57.9	+3 56 14.1	+38 23.6	9.4881937	9.8329810	9.8303939
	22	93 46 59.2	6 14 33.4	12 50.8	5 6 17.4	31 20.0	9.4915388	9.8298346	9.8312838
	24	106 6 47.5	6 4 24.0	11 21.0	6 0 35.7	22 48.8	9.4981722	9.8346409	9.8397352
	26	118 1 37.4	5 49 48.4	7 56.3	6 37 16.0	13 32.5	9.5075617	9.8463459	9.8542272
	28	129 24 2.0	5 32 13.8	+ 3 25.0	6 56 24.8	+ 5 24.6	9.5190399	9.8631227	9.8727869
	30	140 9 34.5	5 13 10.7	- 1 21.0	+6 59 36.7	- 2 0.2	9.5319155	9.8829952	9.8935501
32	150 16 36.4	4 53 54.1	- 5 40.9	+6 49 17.2	- 8 5.8	9.5455537	9.9042829	9.9150565	

VENUS.								
GREENWICH MEAN NOON.								
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
Jan.	0 253 50 31.2	1 35 14.5	-0 12.1	+0 6 50.1	-5 38.6	9.8609698	0.2215531	0.2225668
	4 260 11 14.9	1 35 7.6	+0 27.8	-0 15 43.4	5 37.4	9.8612350	0.2235379	0.2244674
	8 266 31 33.3	1 35 1.8	1 6.4	0 38 3.9	5 34.1	9.8614766	0.2253561	0.2262038
	12 272 51 30.9	1 34 57.2	1 41.7	0 59 55.0	5 22.8	9.8616914	0.2270106	0.2277765
	16 279 11 12.4	1 34 53.8	2 12.1	1 21 1.1	5 9.6	9.8618770	0.2285008	0.2291837
	20 285 30 42.6	1 34 51.5	+2 36.0	-1 41 7.2	-4 52.8	9.8620309	0.2298243	0.2304229
	24 291 50 5.9	1 34 50.3	2 52.3	1 59 58.7	4 32.4	9.8621518	0.2309796	0.2314945
	28 298 9 26.8	1 34 50.2	3 0.2	2 17 22.1	4 8.8	9.8622380	0.2319679	0.2324004
Feb.	1 304 28 49.2	1 34 51.1	2 59.4	2 33 5.0	3 42.2	9.8622885	0.2327926	0.2331449
	5 310 48 16.9	1 34 52.9	2 49.9	2 46 56.2	3 13.0	9.8623027	0.2334576	0.2337308
	9 317 7 53.3	1 34 55.4	+2 32.2	-2 58 45.7	-2 41.4	9.8622804	0.2339641	0.2341579
	13 323 27 41.3	1 34 58.7	2 7.0	3 8 24.8	2 7.9	9.8622220	0.2343105	0.2344214
	17 329 47 43.5	1 35 2.5	1 35.7	3 15 46.5	1 32.7	9.8621282	0.2344901	0.2345162
	21 336 8 2.1	1 35 6.9	0 59.7	3 20 45.1	0 56.4	9.8620000	0.2344987	0.2344367
	25 342 28 38.9	1 35 11.6	+0 20.7	3 23 16.8	-0 19.4	9.8618389	0.2343298	0.2341790
	Mar. 1 348 49 35.1	1 35 16.6	-0 19.2	-3 23 19.5	+0 18.0	9.8616469	0.2339840	0.2337443
Mar.	5 355 10 52.1	1 35 22.0	0 58.3	3 20 52.7	0 55.3	9.8614262	0.2334602	0.2331315
	9 1 32 31.1	1 35 27.6	1 34.6	3 15 57.7	1 32.0	9.8611795	0.2327583	0.2323396
	13 7 54 32.7	1 35 33.3	2 6.3	3 8 37.7	2 7.7	9.8609099	0.2318743	0.2313617
	17 14 16 57.6	1 35 39.2	2 31.8	2 58 57.6	2 42.0	9.8606203	0.2308007	0.2301899
	21 20 39 46.5	1 35 45.3	-2 49.8	-2 47 3.9	+3 14.4	9.8603146	0.2295285	0.2288148
	25 27 3 0.0	1 35 51.5	2 59.4	2 33 5.1	3 44.5	9.8599961	0.2280481	0.2272279
	29 33 26 38.9	1 35 58.0	3 0.2	2 17 10.9	4 12.0	9.8596691	0.2263540	0.2254258
	Apr. 2 39 50 43.8	1 36 4.6	2 52.0	1 59 32.8	4 36.5	9.8593374	0.2244433	0.2234056
Apr.	6 46 15 15.5	1 36 11.3	2 35.3	1 40 23.5	4 57.6	9.8590052	0.2223131	0.2211648
	10 52 40 14.4	1 36 18.2	-2 10.7	-1 19 57.1	+5 15.0	9.8586767	0.2199597	0.2186968
	14 59 5 41.3	1 36 25.3	1 39.5	0 58 28.6	5 28.6	9.8583558	0.2173755	0.2159937
	18 65 31 37.0	1 36 32.5	1 3.4	0 36 14.2	5 38.0	9.8580471	0.2145499	0.2130427
	22 71 58 1.5	1 36 39.8	-0 24.0	-0 13 30.6	5 43.2	9.8577541	0.2114711	0.2098341
	26 78 24 55.1	1 36 47.0	+0 16.7	+0 9 25.2	5 44.0	9.8574806	0.2081309	0.2063610
	30 84 52 17.6	1 36 54.2	+0 56.6	+0 32 15.4	+5 40.4	9.8572303	0.2045234	0.2026186
	May 4 91 20 8.3	1 37 1.2	1 33.7	0 54 42.5	5 32.4	9.8570064	0.2006462	0.1986051
May	8 97 48 26.4	1 37 7.8	2 6.0	1 16 29.1	5 20.2	9.8568117	0.1964954	0.1943162
	12 104 17 10.1	1 37 13.9	2 31.9	1 37 18.2	5 3.7	9.8566489	0.1920662	0.1897441
	16 110 46 17.1	1 37 19.5	2 50.1	1 56 53.6	4 43.3	9.8565199	0.1873485	0.1848781
	20 117 15 44.8	1 37 24.2	+2 59.6	+2 14 59.7	+4 19.2	9.8564267	0.1823313	0.1797073
	24 123 45 29.8	1 37 28.1	3 0.0	2 31 22.4	3 51.6	9.8563704	0.1770045	0.1742221
	28 130 15 28.0	1 37 30.8	2 51.1	2 45 48.7	3 21.1	9.8563517	0.1713598	0.1684175
	June 1 136 45 34.9	1 37 32.4	2 33.5	2 58 7.3	2 47.8	9.8563710	0.1653950	0.1622918
	5 143 15 45.6	1 37 32.7	2 8.0	3 8 8.6	2 12.4	9.8564278	0.1591081	0.1558430
June	9 149 45 54.7	1 37 31.6	+1 36.0	+3 15 44.6	+1 35.4	9.8565217	0.1524961	0.1490662
	13 156 15 56.8	1 37 29.2	0 58.9	3 20 49.7	0 57.0	9.8566513	0.1455518	0.1419514
	17 162 45 46.1	1 37 25.2	+0 18.9	3 23 20.2	+0 18.1	9.8568148	0.1382636	0.1344872
	21 169 15 16.9	1 37 19.9	-0 22.0	3 23 14.4	-0 21.1	9.8570102	0.1306208	0.1266627
	25 175 44 24.0	1 37 13.4	1 1.6	3 20 32.9	0 59.8	9.8572349	0.1226126	0.1184697
	29 182 13 2.5	1 37 5.6	-1 38.2	+3 15 18.1	-1 37.5	9.8574859	0.1142336	0.1099044
	33 188 41 7.8	1 36 56.7	-2 9.7	+3 7 34.7	-2 13.8	9.8577599	0.1054814	0.1009643

VENUS.												
GREENWICH MEAN NOON.												
Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
	°	'	"			°	'	"			At Date.	At Intermediate Date.
July	3	188	41 7.8	1 36 56.7	-2 9.7	+3 7 34.7	-2 13.8	9.8577599	0.1054814	0.1009643		
	7	195	8 36.1	1 36 47.1	2 34.6	2 57 29.3	2 48.4	9.8580534	0.0963526	0.0916449		
	11	201	35 24.3	1 36 36.8	2 51.7	2 45 10.1	3 20.7	9.8583628	0.0868405	0.0819373		
	15	208	1 30.0	1 36 26.0	3 0.1	2 30 47.2	3 50.2	9.8586840	0.0769331	0.0718260		
	19	214	26 52.2	1 36 15.0	2 59.5	2 14 32.0	4 16.8	9.8590127	0.0666139	0.0612945		
	23	220	51 30.2	1 36 4.0	-2 49.9	+1 56 37.3	-4 40.0	9.8593450	0.0558665	0.0503280		
	27	227	15 24.3	1 35 53.2	2 31.8	1 37 17.1	4 59.5	9.8596768	0.0446780	0.0389151		
	31	233	38 36.1	1 35 42.8	2 6.4	1 16 46.2	5 15.3	9.8600038	0.0330387	0.0270475		
Aug.	4	240	1 7.3	1 35 33.0	1 34.6	0 55 20.2	5 27.1	9.8603220	0.0209403	0.0147158		
	8	246	23 1.0	1 35 24.0	0 58.3	0 33 14.7	5 34.0	9.8606275	0.0083711	0.0019040		
	12	252	44 20.3	1 35 15.9	-0 19.1	+0 10 46.6	-3 38.5	9.8609165	9.9953118	9.9885908		
	16	259	5 9.3	1 35 8.8	+0 21.0	-0 11 47.6	5 38.0	9.8611855	9.9817376	9.9747478		
	20	265	25 32.3	1 35 2.8	0 59.9	0 34 11.4	5 33.3	9.8614315	9.9676182	9.9603449		
	24	271	45 33.8	1 34 58.0	1 35.9	0 56 8.8	5 24.7	9.8616511	9.9529248	9.9453547		
	28	278	5 18.3	1 34 54.4	2 7.2	1 17 23.9	5 12.2	9.8618421	9.9376322	9.9297538		
	Sept.	1	284	24 50.5	1 34 51.9	+2 32.3	-1 37 41.5	-4 56.0	9.8620019	9.9217171	9.9135195	
5		290	44 15.1	1 34 50.6	2 50.0	1 56 47.1	4 36.2	9.8621287	9.9051565	9.8966252		
9		297	3 36.5	1 34 50.3	2 59.5	2 14 26.8	4 13.2	9.8622210	9.8879190	9.8790329		
13		303	22 58.8	1 34 51.0	3 0.2	2 30 28.2	3 47.1	9.8622777	9.8699606	9.8606961		
17		309	42 25.8	1 34 52.6	2 52.1	2 44 39.8	3 18.2	9.8622982	9.8512326	9.8415633		
21		316	2 0.9	1 34 55.0	+2 35.7	-2 56 51.2	-2 47.0	9.8622823	9.8316825	9.8215850		
25		322	21 47.1	1 34 58.2	2 11.8	3 6 53.6	2 13.8	9.8622303	9.8112657	9.8007196		
29		328	41 47.0	1 35 1.9	1 41.5	3 14 39.7	1 39.0	9.8621426	9.7899435	9.7789332		
Oct.	3	335	2 2.9	1 35 6.1	1 6.2	3 20 3.6	1 2.8	9.8620203	9.7676854	9.7561965		
	7	341	22 36.7	1 35 10.8	+0 27.6	3 23 1.2	-0 25.9	9.8618649	9.7444624	9.7324797		
	11	347	43 29.9	1 35 15.8	-0 12.3	-3 23 30.0	+0 11.5	9.8616783	9.7202449	9.7077546		
	15	354	4 43.7	1 35 21.1	0 51.7	3 21 29.2	0 48.8	9.8614627	9.6950080	9.6820058		
	19	0 26 19.2	1 35 26.7	1 28.6	3 16 59.8	1 25.7	9.8612206	9.6687522	9.6552552			
	23	6 48 17.2	1 35 32.4	2 1.2	3 10 4.8	2 1.6	9.8609550	9.6415276	9.6275885			
	27	13 10 38.3	1 35 38.2	2 27.8	3 0 48.7	2 36.2	9.8606690	9.6134636	9.5991860			
	31	19 33 23.3	1 35 44.3	-2 47.2	-2 49 17.7	+3 9.0	9.8603661	9.5847979	9.5703510			
Nov.	4	25 56 32.9	1 35 50.5	2 58.4	2 35 40.0	3 39.5	9.8600502	9.5559077	9.5415433			
	8	32 20 7.7	1 35 56.9	3 0.7	2 20 5.0	4 7.5	9.8597250	9.5273467	9.5134219			
	12	38 44 8.3	1 36 3.4	2 54.1	2 2 44.1	4 32.5	9.8593947	9.4998903	9.4868938			
	16	45 8 35.4	1 36 10.1	2 38.7	1 43 49.7	4 54.2	9.8590633	9.4745925	9.4631617			
	20	51 33 29.7	1 36 17.0	-2 15.5	-1 23 35.7	+5 12.2	9.8587350	9.4527914	9.4436785			
	24	57 58 51.8	1 36 24.0	1 45.3	1 2 16.9	5 26.5	9.8584140	9.4360182	9.4299901			
	28	64 24 42.3	1 36 31.2	1 10.0	0 40 9.3	5 36.6	9.8581044	9.4257455	9.4233971			
	Dec. 2	70 51 1.5	1 36 38.4	-0 31.0	-0 17 29.4	5 42.6	9.8578100	9.4230086	9.4245889			
	6	77 17 49.6	1 36 45.6	+0 9.6	+0 5 25.5	5 44.2	9.8575348	9.4280903	9.4334161			
	10	83 45 6.4	1 36 52.7	+0 49.8	+0 28 17.9	+5 41.3	9.8572821	9.4404287	9.4489614			
	14	90 12 51.4	1 36 59.7	1 27.4	0 50 50.3	5 34.1	9.8570555	9.4588289	9.4698396			
	18	96 41 3.6	1 37 6.4	2 0.8	1 12 45.1	5 22.6	9.8568577	9.4818065	9.4945504			
	22	103 9 41.5	1 37 12.6	2 27.9	1 33 45.3	5 6.8	9.8566913	9.5079051	9.5217201			
	26	109 38 43.1	1 37 18.1	2 47.5	1 53 34.6	4 47.1	9.8565584	9.5358624	9.5502144			
	30	116 8 5.5	1 37 22.9	+2 58.6	+2 11 57.3	+4 23.6	9.8564608	9.5646751	9.5791606			
	34	122 37 45.5	1 37 26.9	+3 0.6	+2 28 39.0	+5 56.6	9.8563999	9.5935995	9.6079346			

MARS.													
GREENWICH MEAN NOON.													
Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—		
	°	'	"			°	'	"			At Date.	At Intermediate Date.	
Jan.	0	261	8 28.6	33 36.41	+48.7	0	59	28.1	-34.97	0.1674521	0.3840531	0.3830351	
	4	263	23 21.8	33 50.80	50.4	1	3	6.0	53.92	0.1659817	0.3819985	0.3809440	
	8	265	39 10.0	34 3.91	51.7	1	6	39.4	52.78	0.1645267	0.3798728	0.3787841	
	12	267	55 52.8	34 17.55	52.9	1	10	8.1	51.51	0.1630892	0.3776791	0.3765568	
	16	270	13 30.3	34 31.10	53.5	1	13	31.4	50.10	0.1616722	0.3754201	0.3742658	
	20	272	32 1.5	34 44.55	+53.9	-1	16	48.9	-48.57	0.1602781	0.3730959	0.3719101	
	24	274	51 26.5	34 57.86	53.9	1	20	0.1	46.94	0.1589099	0.3707090	0.3694931	
	28	277	11 44.1	35 10.88	53.5	1	23	4.5	45.80	0.1575697	0.3682639	0.3670214	
	Feb.	1	279	32 53.2	35 23.74	52.9	1	26	1.7	43.52	0.1562606	0.3657676	0.3645027
		5	281	54 53.7	35 36.31	51.7	1	28	51.1	41.34	0.1549856	0.3632274	0.3619424
	9	284	17 43.6	35 48.61	+50.3	-1	31	32.4	-39.24	0.1537470	0.3606478	0.3593433	
	13	286	41 22.2	36 0.55	48.4	1	34	5.0	37.02	0.1525477	0.3580302	0.3567074	
	17	289	5 47.6	36 12.17	46.4	1	36	28.5	34.69	0.1513904	0.3553749	0.3540332	
	21	291	30 59.2	36 23.49	43.9	1	38	42.5	32.25	0.1502776	0.3526824	0.3513238	
	25	293	56 54.9	36 34.31	41.1	1	40	46.5	29.71	0.1492119	0.3499569	0.3485833	
Mar.	1	296	23 33.1	36 44.62	+37.9	-1	42	40.2	-27.07	0.1481961	0.3472032	0.3458177	
	5	298	50 51.6	36 54.50	34.5	1	44	23.1	24.34	0.1472324	0.3444276	0.3430330	
	9	301	18 48.6	37 3.91	30.9	1	45	54.9	21.90	0.1463232	0.3416343	0.3402311	
	13	303	47 22.1	37 12.74	26.9	1	47	15.1	18.60	0.1454708	0.3388239	0.3374119	
	17	306	16 29.7	37 20.95	22.7	1	48	23.7	15.64	0.1446776	0.3359952	0.3345734	
	21	308	46 8.9	37 28.54	+18.4	-1	49	20.2	-12.59	0.1439452	0.3331464	0.3317144	
	25	311	16 17.2	37 35.47	13.9	1	50	4.4	9.49	0.1432759	0.3302779	0.3288373	
	29	313	46 51.9	37 41.80	9.4	1	50	36.1	6.34	0.1426714	0.3273931	0.3259460	
	Apr.	2	316	17 50.7	37 47.44	+ 4.6	1	50	55.1	- 3.14	0.1421332	0.3244961	0.3230438
		6	318	49 10.5	37 52.32	- 0.1	1	51	1.2	+ 0.07	0.1416628	0.3215893	0.3201320
	10	321	20 48.4	37 56.52	- 4.8	-1	50	54.5	+ 3.31	0.1412616	0.3186720	0.3172081	
	14	323	52 41.7	37 59.96	9.5	1	50	34.7	6.56	0.1409303	0.3157398	0.3142668	
	18	326	24 47.1	38 2.69	14.1	1	50	2.0	9.80	0.1406704	0.3127886	0.3113043	
	22	328	57 2.2	38 4.70	18.7	1	49	16.3	13.04	0.1404823	0.3098150	0.3083197	
	26	331	29 23.6	38 5.85	23.1	1	48	17.7	10.24	0.1403665	0.3068187	0.3053132	
May	30	334	1 48.0	38 6.24	-27.3	-1	47	6.4	+19.41	0.1403231	0.3038020	0.3022858	
	4	336	34 12.5	38 5.85	31.4	1	45	42.4	22.55	0.1403529	0.3007642	0.2992368	
	8	339	6 33.8	38 4.69	35.1	1	44	6.0	25.68	0.1404554	0.2977030	0.2961617	
	12	341	38 49.0	38 2.79	38.6	1	42	17.4	28.64	0.1406303	0.2946120	0.2930529	
	16	344	10 55.1	38 0.11	41.8	1	40	16.9	31.57	0.1408772	0.2914827	0.2899019	
	20	346	42 48.9	37 56.67	-44.6	-1	38	4.8	+34.42	0.1411955	0.2883093	0.2867043	
	24	349	14 27.5	37 52.49	47.1	1	35	41.5	37.19	0.1415840	0.2850871	0.2834573	
	28	351	45 47.9	37 47.64	49.1	1	33	7.3	39.85	0.1420417	0.2818148	0.2801596	
	June	1	354	16 47.7	37 42.10	50.9	1	30	22.7	42.40	0.1425674	0.2784912	0.2768086
		5	356	47 23.8	37 35.82	52.3	1	27	28.1	44.84	0.1431599	0.2751112	0.2733977
	9	359	17 33.5	37 28.91	-53.3	-1	24	24.0	+47.15	0.1438177	0.2716663	0.2699170	
	13	1	47 14.3	37 21.57	53.8	1	21	10.9	49.35	0.1445386	0.2681470	0.2663553	
	17	4	16 23.7	37 13.17	53.9	1	17	49.2	51.42	0.1453209	0.2645417	0.2627046	
	21	6	44 59.6	37 4.45	53.6	1	14	19.5	53.34	0.1461629	0.2608439	0.2589586	
	25	9	12 58.6	36 55.17	53.0	1	10	42.5	55.12	0.1470620	0.2570490	0.2551142	
July	29	11	40 19.7	36 45.32	-52.0	-1	6	58.5	+56.79	0.1480159	0.2531535	0.2511665	
	3	14	7 0.6	36 35.02	-50.4	-1	3	8.2	+58.29	0.1490226	0.2491521	0.2471086	



## MARS.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							Date.	At Intermediate Date.
July 3	14 7 0.6	36 35.08	-50.4	-1 3 8.2	+58.89	0.1490226	0.2491521	0.2471086
7	16 32 59.4	36 24.31	48.6	0 59 12.2	59.65	0.1500796	0.2450348	0.2429281
11	18 58 14.5	36 13.15	46.5	0 55 11.0	60.89	0.1511842	0.2407883	0.2386124
15	21 22 44.1	36 1.59	44.0	0 51 5.1	61.97	0.1523338	0.2363998	0.2341489
19	23 46 26.8	35 49.71	41.3	0 46 55.2	62.90	0.1535261	0.2318594	0.2295301
23	26 9 21.3	35 37.43	-38.3	-0 42 41.9	+63.70	0.1547580	0.2271604	0.2247493
27	28 31 25.9	35 24.91	35.0	0 38 25.6	64.37	0.1560272	0.2222971	0.2198023
31	30 52 40.3	35 12.17	31.5	0 34 6.9	64.91	0.1573307	0.2172637	0.2146798
Aug. 4	33 13 3.0	34 59.16	27.9	0 29 46.3	65.30	0.1586658	0.2120488	0.2093691
8	35 32 33.4	34 46.00	24.0	0 25 24.5	65.56	0.1600299	0.2066379	0.2038542
12	37 51 10.8	34 32.65	-20.1	-0 21 1.8	+65.72	0.1614201	0.2010152	0.1981209
16	40 8 54.4	34 19.15	15.9	0 16 38.7	65.76	0.1628338	0.1951687	0.1921578
20	42 25 43.9	34 5.59	11.8	0 12 15.7	65.66	0.1642683	0.1890880	0.1859581
24	44 41 39.0	33 51.95	7.6	0 7 53.4	65.45	0.1657210	0.1827677	0.1795153
28	46 56 39.4	33 38.24	-3.4	-0 3 32.1	65.15	0.1671893	0.1762007	0.1728208
Sept. 1	49 10 44.9	33 24.52	+0.8	+0 0 47.8	+64.74	0.1686708	0.1693746	0.1658594
5	51 23 55.6	33 10.81	4.9	0 5 5.8	64.24	0.1701623	0.1622736	0.1586150
9	53 36 11.4	32 57.13	9.1	0 9 21.7	63.64	0.1716622	0.1548810	0.1510699
13	55 47 32.7	32 43.49	13.0	0 13 34.9	62.94	0.1731675	0.1471804	0.1432113
17	57 57 59.4	32 29.88	17.0	0 17 45.2	62.16	0.1746761	0.1391619	0.1350312
21	60 7 31.8	32 16.39	+20.8	+0 21 52.2	+61.30	0.1761860	0.1308187	0.1265239
25	62 16 10.6	32 3.02	24.5	0 25 55.6	60.39	0.1776948	0.1221452	0.1176811
29	64 23 56.2	31 49.77	28.0	0 29 55.3	59.40	0.1792002	0.1131301	0.1084903
Oct. 3	66 30 49.0	31 36.67	31.3	0 33 50.8	58.34	0.1807002	0.1037591	0.0989346
7	68 36 49.8	31 23.74	34.4	0 37 42.0	57.22	0.1821928	0.0940149	0.0889987
11	70 41 59.1	31 10.94	+37.4	+0 41 28.6	+56.05	0.1836763	0.0838842	0.0786713
15	72 46 17.8	30 58.37	40.0	0 45 10.4	54.82	0.1851488	0.0733602	0.0679507
19	74 49 46.3	30 45.95	42.6	0 48 47.2	53.55	0.1866083	0.0624427	0.0568370
23	76 52 25.7	30 33.79	44.8	0 52 18.8	52.24	0.1880531	0.0511348	0.0453347
27	78 54 16.9	30 21.85	46.8	0 55 45.1	50.89	0.1894819	0.0394378	0.0334436
31	80 55 20.8	30 10.14	+48.5	+0 59 5.9	+49.49	0.1908926	0.0273513	0.0211618
Nov. 4	82 55 38.0	29 58.64	50.1	1 2 21.0	48.05	0.1922843	0.0148751	0.0084928
8	84 55 9.9	29 47.31	51.3	1 5 30.3	46.60	0.1936552	0.0020168	0.9954522
12	86 53 56.9	29 36.30	52.4	1 8 33.8	45.12	0.1950041	0.9888015	0.9820711
16	88 52 0.7	29 25.56	53.1	1 11 31.3	43.61	0.1963296	0.9752669	0.9683962
20	90 49 21.8	29 15.06	+53.6	+1 14 22.7	+42.07	0.1976304	0.9614664	0.9544861
24	92 46 1.7	29 4.89	53.9	1 17 7.9	40.52	0.1989055	0.9474632	0.9404062
28	94 42 1.3	28 54.96	53.9	1 19 46.9	38.96	0.2001536	0.9333266	0.9262349
Dec. 2	96 37 21.8	28 45.32	53.6	1 22 19.5	37.38	0.2013738	0.9191446	0.9120706
6	98 32 4.2	28 35.89	53.1	1 24 45.9	35.79	0.2025651	0.9050308	0.8980445
10	100 26 9.3	28 26.77	+52.5	+1 27 5.8	+34.18	0.2037263	0.8911351	0.8843273
14	102 19 38.8	28 18.02	51.5	1 29 19.3	32.56	0.2048570	0.8776473	0.8711240
18	104 12 33.8	28 9.50	50.3	1 31 26.3	30.94	0.2059559	0.8647871	0.8586659
22	106 4 55.1	28 1.22	48.9	1 33 26.8	29.31	0.2070222	0.8527928	0.8471995
26	107 56 44.0	27 53.29	47.4	1 35 20.8	27.67	0.2080555	0.8419182	0.8369815
30	109 48 1.8	27 45.70	+45.8	+1 37 8.2	+26.04	0.2090545	0.8324227	0.8282769
34	111 38 50.0	27 38.41	+43.7	+1 38 49.1	+24.40	0.2100192		

JUPITER.												
GREENWICH MEAN NOON.												
Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.		Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—		
	°	'	"			°	'			"	At Date.	At Intermediate Date.
Jan.	0	178	59 17.9	4 32.61	+9.6	+1	17 17.9	+1.13	0.7362793	0.7280373	0.7254143	
	4	179	17 28.3	4 32.58	9.3	I	17 22.4	1.09	0.7363063	0.7227798	0.7201364	
	8	179	35 38.6	4 32.55	9.0	I	17 26.7	1.06	0.7363327	0.7174868	0.7148336	
	12	179	53 48.7	4 32.52	8.7	I	17 30.9	1.03	0.7363585	0.7121802	0.7095293	
	16	180	11 58.7	4 32.49	8.5	I	17 34.9	1.00	0.7363837	0.7068848	0.7042499	
	20	180	30 8.6	4 32.46	+8.2	+1	17 38.8	+0.96	0.7364083	0.7016285	0.6990243	
	24	180	48 18.4	4 32.43	8.0	I	17 42.6	0.93	0.7364322	0.6964417	0.6938848	
	28	181	6 28.0	4 32.40	7.7	I	17 46.3	0.90	0.7364555	0.6913578	0.6888647	
	Feb.	1	181	24 37.5	4 32.37	7.4	I	17 49.8	0.87	0.7364782	0.6864096	0.6839965
		5	181	42 46.9	4 32.34	7.1	I	17 53.2	0.83	0.7365004	0.6816294	0.6793124
	9	182	0 56.3	4 32.31	+6.8	+1	17 56.5	+0.80	0.7365220	0.6770495	0.6748448	
	13	182	19 5.5	4 32.29	6.6	I	17 59.6	0.77	0.7365429	0.6727029	0.6706281	
	17	182	37 14.6	4 32.26	6.3	I	18 2.6	0.74	0.7365632	0.6686249	0.6666977	
	21	182	55 23.6	4 32.24	6.0	I	18 5.5	0.70	0.7365829	0.6648508	0.6630888	
	25	183	13 32.5	4 32.21	5.8	I	18 8.2	0.67	0.7366020	0.6614153	0.6598346	
Mar.	1	183	31 41.3	4 32.19	+5.5	+1	18 10.8	+0.64	0.7366205	0.6583496	0.6569638	
	5	183	49 50.0	4 32.17	5.2	I	18 13.3	0.60	0.7366383	0.6556800	0.6545010	
	9	184	7 58.6	4 32.15	4.9	I	18 15.7	0.57	0.7366555	0.6534294	0.6524683	
	13	184	26 7.2	4 32.13	4.6	I	18 17.9	0.54	0.7366721	0.6516194	0.6508852	
	17	184	44 15.7	4 32.11	4.3	I	18 20.0	0.51	0.7366882	0.6502673	0.6497680	
	21	185	2 24.1	4 32.09	+4.1	+1	18 22.0	+0.48	0.7367037	0.6493880	0.6491291	
	25	185	20 32.4	4 32.07	3.8	I	18 23.8	0.44	0.7367185	0.6489910	0.6489744	
	29	185	38 40.6	4 32.05	3.5	I	18 25.5	0.41	0.7367327	0.6490783	0.6493025	
	Apr.	2	185	56 48.8	4 32.04	3.2	I	18 27.1	0.37	0.7367463	0.6496454	0.6501061
		6	186	14 56.9	4 32.02	3.0	I	18 28.5	0.34	0.7367592	0.6506827	0.6513737
	10	186	33 5.0	4 32.00	+2.7	+1	18 29.8	+0.31	0.7367715	0.6521771	0.6530911	
	14	186	51 12.9	4 31.99	2.4	I	18 31.0	0.28	0.7367832	0.6541131	0.6552412	
	18	187	9 20.9	4 31.98	2.1	I	18 32.0	0.24	0.7367943	0.6564719	0.6578026	
	22	187	27 28.8	4 31.96	1.8	I	18 32.9	0.21	0.7368048	0.6592295	0.6607496	
	26	187	45 36.6	4 31.95	1.6	I	18 33.7	0.18	0.7368147	0.6623586	0.6640525	
	30	188	3 44.4	4 31.94	+1.3	+1	18 34.3	+0.15	0.7368240	0.6658272	0.6676784	
	May	4	188	21 52.1	4 31.93	1.0	I	18 34.9	0.11	0.7368326	0.6696022	0.6715945
		8	188	39 59.8	4 31.92	0.7	I	18 35.3	0.08	0.7368406	0.6736515	0.6757692
	12	188	58 7.5	4 31.91	0.4	I	18 35.5	0.05	0.7368480	0.6779439	0.6801717	
	16	189	16 15.1	4 31.90	+0.2	I	18 35.6	+0.01	0.7368548	0.6824486	0.6847708	
	20	189	34 22.7	4 31.89	-0.1	+1	18 35.6	-0.02	0.7368610	0.6871340	0.6895341	
	24	189	52 30.2	4 31.89	0.4	I	18 35.5	0.05	0.7368665	0.6919672	0.6944292	
	28	190	10 37.8	4 31.88	0.7	I	18 35.2	0.08	0.7368714	0.6969163	0.6994244	
	June	1	190	28 45.3	4 31.88	1.0	I	18 34.8	0.11	0.7368757	0.7019505	0.7044912
		5	190	46 52.8	4 31.87	1.3	I	18 34.3	0.15	0.7368794	0.7070435	0.7096039
	9	191	5 0.3	4 31.87	-1.6	+1	18 33.6	-0.15	0.7368825	0.7121698	0.7147385	
	13	191	23 7.7	4 31.86	1.8	I	18 32.8	0.21	0.7368849	0.7173073	0.7198734	
	17	191	41 15.2	4 31.86	2.1	I	18 31.9	0.25	0.7368867	0.7224339	0.7249859	
	21	191	59 22.6	4 31.86	2.4	I	18 30.9	0.28	0.7368879	0.7275270	0.7300545	
	25	192	17 30.1	4 31.86	2.7	I	18 29.7	0.31	0.7368885	0.7325662	0.7350595	
	29	192	35 37.5	4 31.86	-3.0	+1	18 28.4	-0.35	0.7368885	0.7375326	0.7399835	
	July 3	192	53 44.9	4 31.86	-3.2	+1	18 26.9	-0.38	0.7368878	0.7424106	0.7448122	

## JUPITER.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
							At Date.	At Intermediate Date.
July	3 192 53 44.9	4 31.86	— 3.2	+1 18 26.9	—0.38	0.7368878	0.7424106	0.7448122
	7 193 11 52.4	4 31.86	3.5	1 18 25.3	0.41	0.7368865	0.7471868	0.7495331
	11 193 29 59.8	4 31.86	3.8	1 18 23.6	0.44	0.7368846	0.7518494	0.7541343
	15 193 48 7.3	4 31.87	4.1	1 18 21.8	0.47	0.7368821	0.7563862	0.7586036
	19 194 6 14.8	4 31.87	4.4	1 18 19.9	0.51	0.7368789	0.7607851	0.7629291
	23 194 24 22.3	4 31.88	— 4.6	+1 18 17.8	—0.54	0.7368751	0.7650345	0.7671000
	27 194 42 29.8	4 31.88	4.9	1 18 15.5	0.57	0.7368707	0.7691248	0.7711079
	31 195 0 37.3	4 31.89	5.2	1 18 13.2	0.61	0.7368657	0.7730486	0.7749459
	Aug. 4 195 18 44.9	4 31.89	5.5	1 18 10.7	0.64	0.7368601	0.7767994	0.7786084
	8 195 36 52.5	4 31.90	5.7	1 18 8.1	0.67	0.7368538	0.7803721	0.7820900
	12 195 55 0.1	4 31.91	— 6.0	+1 18 5.3	—0.70	0.7368469	0.7837610	0.7853842
	16 196 13 7.7	4 31.92	6.3	1 18 2.4	0.74	0.7368394	0.7869590	0.7884845
	20 196 31 15.4	4 31.93	6.5	1 17 59.4	0.77	0.7368313	0.7899601	0.7913851
	24 196 49 23.2	4 31.94	6.8	1 17 56.3	0.80	0.7368226	0.7927592	0.7940819
	28 197 7 30.9	4 31.95	7.1	1 17 53.0	0.83	0.7368133	0.7953530	0.7965722
	Sept. 1 197 25 38.8	4 31.96	— 7.4	+1 17 49.6	—0.87	0.7368033	0.7977391	0.7988535
	5 197 43 46.7	4 31.98	7.7	1 17 46.1	0.90	0.7367927	0.7999150	0.8009236
	9 198 1 54.6	4 31.99	7.9	1 17 42.4	0.93	0.7367815	0.8018784	0.8027789
	13 198 20 2.6	4 32.00	8.2	1 17 38.6	0.96	0.7367697	0.8036247	0.8044153
	17 198 38 10.6	4 32.02	8.5	1 17 34.7	1.00	0.7367573	0.8051505	0.8058296
	21 198 56 18.7	4 32.03	— 8.8	+1 17 30.7	—1.03	0.7367443	0.8064527	0.8070196
	25 199 14 26.9	4 32.05	9.0	1 17 26.5	1.06	0.7367306	0.8075301	0.8079843
	29 199 32 35.1	4 32.07	9.3	1 17 22.2	1.09	0.7367163	0.8083821	0.8087235
	Oct. 3 199 50 43.4	4 32.09	9.6	1 17 17.7	1.12	0.7367014	0.8090082	0.8092360
	7 200 8 51.8	4 32.11	9.8	1 17 13.2	1.16	0.7366859	0.8094069	0.8095203
	11 200 27 0.3	4 32.13	—10.1	+1 17 8.5	—1.19	0.7366698	0.8095760	0.8095736
	15 200 45 8.8	4 32.15	10.3	1 17 3.7	1.22	0.7366531	0.8095129	0.8093938
	19 201 3 17.5	4 32.17	10.6	1 16 58.7	1.26	0.7366358	0.8092162	0.8089801
	23 201 21 26.2	4 32.19	10.9	1 16 53.6	1.29	0.7366178	0.8086858	0.8083335
	27 201 39 35.0	4 32.21	11.1	1 16 48.4	1.32	0.7365992	0.8079232	0.8074552
	31 201 57 43.9	4 32.24	—11.4	+1 16 43.1	—1.35	0.7365800	0.8069293	0.8063453
	Nov. 4 202 15 52.9	4 32.26	11.6	1 16 37.6	1.38	0.7365602	0.8057033	0.8050032
	8 202 34 2.0	4 32.29	11.9	1 16 32.0	1.42	0.7365398	0.8042450	0.8034284
	12 202 52 11.2	4 32.32	12.2	1 16 26.3	1.45	0.7365188	0.8025537	0.8016209
	16 203 10 20.5	4 32.34	12.4	1 16 20.4	1.48	0.7364973	0.8006303	0.7995820
	20 203 28 29.9	4 32.37	—12.7	+1 16 14.4	—1.51	0.7364751	0.7984765	0.7973143
	24 203 46 39.4	4 32.40	12.9	1 16 8.3	1.54	0.7364523	0.7960958	0.7948215
	28 204 4 49.1	4 32.43	13.2	1 16 2.1	1.58	0.7364289	0.7934917	0.7921066
	Dec. 2 204 22 58.9	4 32.46	13.4	1 15 55.7	1.61	0.7364048	0.7906665	0.7891718
	6 204 41 8.8	4 32.49	13.7	1 15 49.2	1.64	0.7363801	0.7876228	0.7860195
	10 204 59 18.8	4 32.52	—13.9	+1 15 42.6	—1.67	0.7363549	0.7843627	0.7826529
	14 205 17 28.9	4 32.55	14.2	1 15 35.8	1.70	0.7363291	0.7808909	0.7790776
	18 205 35 39.2	4 32.58	14.4	1 15 29.0	1.74	0.7363026	0.7772139	0.7753003
	22 205 53 49.6	4 32.62	14.6	1 15 22.0	1.77	0.7362755	0.7733384	0.7713295
	26 206 12 0.1	4 32.65	14.9	1 15 14.8	1.80	0.7362478	0.7692743	0.7671735
	30 206 30 10.8	4 32.69	—15.1	+1 15 7.6	—1.83	0.7362195	0.7650282	0.7628393
	34 206 48 21.6	4 32.73	—15.3	+1 15 0.2	—1.86	0.7361906		

SATURN.															
GREENWICH MEAN NOON.															
Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—				
	°	'	"			'	"	°			'	"	At Date.	At Intermediate Date.	
Jan.	4	244	32	34.4	1 49.72	-1	37.0	+1	51	30.1	-3.17	1.0001090	1.0325067	1.0316916	
	8	244	39	53.2	1 49.71	1	37.1	1	51	17.4	3.18	1.0001339	1.0308412	1.0299561	
	12	244	47	12.0	1 49.70	1	37.1	1	51	4.7	3.19	1.0001587	1.0290369	1.0280840	
	16	244	54	30.8	1 49.68	1	37.2	1	50	51.9	3.19	1.0001834	1.0270982	1.0260803	
	20	245	1	49.5	1 49.67	1	37.2	1	50	39.1	3.20	1.0002079	1.0250309	1.0239507	
	24	245	9	8.2	1 49.66	-1	37.2	+1	50	26.3	-3.21	1.0002323	1.0228408	1.0217022	
	28	245	16	26.8	1 49.65	1	37.3	1	50	13.5	3.21	1.0002566	1.0205360	1.0193433	
	Feb.	1	245	23	45.3	1 49.63	1	37.3	1	50	0.6	3.22	1.0002808	1.0181252	1.0168826
		5	245	31	3.8	1 49.62	1	37.3	1	49	47.7	3.23	1.0003049	1.0156167	1.0143286
		9	245	38	22.3	1 49.61	1	37.4	1	49	34.7	3.24	1.0003290	1.0130194	1.0116902
	13	245	45	40.7	1 49.60	-1	37.4	+1	49	21.8	-3.25	1.0003530	1.0103422	1.0089762	
	17	245	52	59.1	1 49.59	1	37.4	1	49	8.8	3.25	1.0003769	1.0075939	1.0061967	
	21	246	0	17.4	1 49.57	1	37.4	1	48	55.7	3.26	1.0004006	1.0047861	1.0033637	
	25	246	7	35.7	1 49.56	1	37.5	1	48	42.7	3.27	1.0004242	1.0019310	1.0004896	
	Mar.	1	246	14	53.9	1 49.55	1	37.5	1	48	29.6	3.27	1.0004477	0.9990412	0.9975874
5		246	22	12.1	1 49.54	-1	37.5	+1	48	16.5	-3.28	1.0004711	0.9961298	0.9946700	
9		246	29	30.2	1 49.53	1	37.5	1	48	3.4	3.28	1.0004944	0.9932096	0.9917500	
	13	246	36	48.3	1 49.52	1	37.5	1	47	50.2	3.29	1.0005176	0.9902931	0.9888405	
	17	246	44	6.4	1 49.50	1	37.5	1	47	37.1	3.30	1.0005407	0.9873940	0.9859555	
	21	246	51	24.4	1 49.49	1	37.5	1	47	23.8	3.31	1.0005637	0.9845270	0.9831104	
	25	246	58	42.3	1 49.48	-1	37.6	+1	47	10.6	-3.32	1.0005866	0.9817077	0.9803213	
	29	247	6	0.2	1 49.47	1	37.6	1	46	57.3	3.32	1.0006095	0.9789527	0.9776037	
Apr.	2	247	13	18.1	1 49.46	1	37.6	1	46	44.0	3.33	1.0006322	0.9762762	0.9749723	
	6	247	20	35.9	1 49.45	1	37.6	1	46	30.7	3.34	1.0006548	0.9736935	0.9724416	
	10	247	27	53.7	1 49.44	1	37.6	1	46	17.3	3.34	1.0006773	0.9712183	0.9700254	
	14	247	35	11.4	1 49.42	-1	37.6	+1	46	3.9	-3.35	1.0006997	0.9688648	0.9677386	
	18	247	42	29.1	1 49.41	1	37.6	1	45	50.5	3.35	1.0007220	0.9666485	0.9655962	
	22	247	49	46.7	1 49.40	1	37.6	1	45	37.1	3.36	1.0007442	0.9645836	0.9636126	
	26	247	57	4.3	1 49.39	1	37.6	1	45	23.7	3.37	1.0007663	0.9626846	0.9618012	
	30	248	4	21.8	1 49.38	1	37.6	1	45	10.2	3.38	1.0007883	0.9609637	0.9601734	
	May	4	248	11	39.3	1 49.37	-1	37.6	+1	44	56.7	-3.38	1.0008102	0.9594314	0.9587389
		8	248	18	56.7	1 49.36	1	37.6	1	44	43.1	3.39	1.0008319	0.9580970	0.9575069
12		248	26	14.1	1 49.35	1	37.6	1	44	29.5	3.40	1.0008536	0.9569695	0.9564860	
	16	248	33	31.5	1 49.34	1	37.6	1	44	15.9	3.40	1.0008752	0.9560572	0.9556841	
	20	248	40	48.9	1 49.33	1	37.6	1	44	2.3	3.41	1.0008967	0.9553672	0.9551074	
	24	248	48	6.2	1 49.32	-1	37.6	+1	43	48.7	-3.41	1.0009181	0.9549048	0.9547600	
	28	248	55	23.4	1 49.31	1	37.6	1	43	35.0	3.42	1.0009394	0.9546729	0.9546438	
	June	1	249	2	40.6	1 49.30	1	37.5	1	43	21.3	3.43	1.0009606	0.9546722	0.9547579
5		249	9	57.8	1 49.28	1	37.5	1	43	7.6	3.44	1.0009817	0.9549008	0.9551009	
9		249	17	14.9	1 49.27	1	37.5	1	42	53.8	3.45	1.0010027	0.9553575	0.9556701	
	13	249	24	32.0	1 49.26	-1	37.5	+1	42	40.0	-3.45	1.0010235	0.9560384	0.9564621	
	17	249	31	49.0	1 49.25	1	37.5	1	42	26.2	3.46	1.0010442	0.9569402	0.9574723	
	21	249	39	6.0	1 49.24	1	37.4	1	42	12.4	3.46	1.0010648	0.9580569	0.9586930	
	25	249	46	23.0	1 49.23	1	37.4	1	41	58.5	3.47	1.0010853	0.9593793	0.9601148	
	29	249	53	39.9	1 49.22	1	37.4	1	41	44.6	3.48	1.0011057	0.9608979	0.9617272	
July	3	250	0	56.7	1 49.21	-1	37.3	+1	41	30.7	-3.48	1.0011261	0.9626012	0.9635186	
	7	250	8	13.6	1 49.20	-1	37.3	+1	41	16.8	-3.49	1.0011464	0.9644778	0.9654775	

## SATURN.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
	°	'	"			°	'	"			Date.	At Intermediate Date.
July	3	250	0 56.7	1 49.21	-1 37.3	+1 41	30.7	-3.48	1.0011261	0.9626012	0.9635186	
	7	250	8 13.6	1 49.20	1 37.3	1 41	16.8	3.49	1.0011464	0.9644778	0.9654775	
	11	250	15 30.4	1 49.19	1 37.3	1 41	2.8	3.49	1.0011666	0.9665161	0.9675922	
	15	250	22 47.1	1 49.18	1 37.2	1 40	48.8	3.50	1.0011866	0.9687041	0.9698503	
	19	250	30 3.8	1 49.17	1 37.2	1 40	34.8	3.51	1.0012065	0.9710289	0.9722380	
	23	250	37 20.5	1 49.16	-1 37.2	+1 40	20.8	-3.51	1.0012263	0.9734757	0.9747400	
	27	250	44 37.1	1 49.15	1 37.1	1 40	6.7	3.52	1.0012460	0.9760292	0.9773415	
	31	250	51 53.7	1 49.14	1 37.1	1 39	52.6	3.52	1.0012656	0.9786749	0.9800275	
	Aug.	4	250	59 10.3	1 49.13	1 37.1	1 39	38.5	3.53	1.0012851	0.9813977	0.9827840
		8	251	6 26.8	1 49.12	1 37.0	1 39	24.3	3.54	1.0013045	0.9841847	0.9855980
12		251	13 43.3	1 49.11	-1 37.0	+1 39	10.2	-3.55	1.0013238	0.9870223	0.9884558	
16		251	20 59.7	1 49.09	1 36.9	1 38	56.0	3.55	1.0013429	0.9898966	0.9913430	
20		251	28 16.1	1 49.08	1 36.9	1 38	41.7	3.56	1.0013619	0.9927933	0.9942457	
24		251	35 32.5	1 49.07	1 36.8	1 38	27.5	3.56	1.0013809	0.9956985	0.9971497	
28		251	42 48.8	1 49.07	1 36.7	1 38	13.2	3.57	1.0013998	0.9985981	1.0000423	
Sept.		1	251	50 5.1	1 49.06	-1 36.7	+1 37	58.9	-3.58	1.0014186	1.0014809	1.0029121
		5	251	57 21.3	1 49.05	1 36.6	1 37	44.6	3.58	1.0014373	1.0043349	1.0057479
		9	252	4 37.5	1 49.04	1 36.5	1 37	30.3	3.59	1.0014558	1.0071499	1.0085395
	13	252	11 53.7	1 49.03	1 36.5	1 37	15.9	3.60	1.0014742	1.0099152	1.0112755	
	17	252	19 9.9	1 49.02	1 36.4	1 37	1.5	3.60	1.0014925	1.0126193	1.0139453	
	21	252	26 26.0	1 49.01	-1 36.3	+1 36	47.1	-3.61	1.0015107	1.0152521	1.0165383	
	25	252	33 42.0	1 49.00	1 36.3	1 36	32.6	3.62	1.0015288	1.0178031	1.0190455	
	29	252	40 58.0	1 48.99	1 36.2	1 36	18.1	3.62	1.0015468	1.0202646	1.0214594	
	Oct.	3	252	48 14.0	1 48.98	1 36.1	1 36	3.6	3.63	1.0015647	1.0226290	1.0237727
		7	252	55 30.0	1 48.98	1 36.1	1 35	49.1	3.63	1.0015825	1.0248896	1.0259786
11		253	2 45.9	1 48.97	-1 36.0	+1 35	34.5	-3.64	1.0016002	1.0270389	1.0280694	
15		253	10 1.8	1 48.96	1 35.9	1 35	20.0	3.64	1.0016178	1.0290694	1.0300379	
19		253	17 17.6	1 48.96	1 35.9	1 35	5.4	3.65	1.0016352	1.0309742	1.0318776	
23		253	24 33.4	1 48.95	1 35.8	1 34	50.8	3.66	1.0016525	1.0327474	1.0335830	
27		253	31 49.2	1 48.94	1 35.7	1 34	36.2	3.66	1.0016697	1.0343840	1.0351501	
31		253	39 5.0	1 48.93	-1 35.6	+1 34	21.5	-3.67	1.0016869	1.0358807	1.0365751	
Nov.		4	253	46 20.7	1 48.92	1 35.5	1 34	6.8	3.68	1.0017040	1.0372330	1.0378540
		8	253	53 36.3	1 48.91	1 35.5	1 33	52.1	3.68	1.0017210	1.0384375	1.0389827
	12	254	0 52.0	1 48.90	1 35.4	1 33	37.4	3.69	1.0017378	1.0394894	1.0399571	
	16	254	8 7.6	1 48.89	1 35.3	1 33	22.6	3.69	1.0017545	1.0403854	1.0407739	
	20	254	15 23.1	1 48.89	-1 35.2	+1 33	7.8	-3.70	1.0017711	1.0411225	1.0414311	
	24	254	22 38.6	1 48.88	1 35.1	1 32	53.0	3.70	1.0017876	1.0416995	1.0419275	
	28	254	29 54.1	1 48.87	1 35.0	1 32	38.2	3.71	1.0018040	1.0421150	1.0422621	
	Dec.	2	254	37 9.6	1 48.86	1 34.9	1 32	23.3	3.72	1.0018203	1.0423686	1.0424341
		6	254	44 25.1	1 48.85	1 34.8	1 32	8.4	3.72	1.0018365	1.0424586	1.0424421
		10	254	51 40.5	1 48.85	-1 34.7	+1 31	53.5	-3.73	1.0018527	1.0423845	1.0422855
14		254	58 55.9	1 48.84	1 34.6	1 31	38.6	3.73	1.0018688	1.0421452	1.0419635	
18		255	6 11.2	1 48.83	1 34.5	1 31	23.7	3.74	1.0018847	1.0417408	1.0414773	
22		255	13 26.5	1 48.82	1 34.4	1 31	8.7	3.74	1.0019005	1.0411733	1.0408289	
26		255	20 41.8	1 48.81	1 34.3	1 30	53.7	3.75	1.0019162	1.0404444	1.0400200	
30		255	27 57.0	1 48.80	-1 34.2	+1 30	38.7	-3.75	1.0019318	1.0395561	1.0390530	
34		255	35 12.2	1 48.79	-1 34.1	+1 30	23.7	-3.76	1.0019472	1.0385108		

URANUS.									
GREENWICH MEAN NOON.									
Date.	Heliocentric Longitude, Mean Equinox of Date.	Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.	Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—		
							At Date.	At Intermediate Date.	
Jan. 4	239 51 28.5	43.88	-4.3	+0 10 58.9	-0.57	1.2755491	1.2917098	1.2906558	
12	239 57 19.5	43.87	4.3	0 10 54.3	0.57	1.2755823	1.2895285	1.2883319	
20	240 3 10.5	43.86	4.2	0 10 49.7	0.57	1.2756156	1.2870706	1.2857496	
28	240 9 1.4	43.85	4.2	0 10 45.1	0.57	1.2756488	1.2843754	1.2829539	
Feb. 5	240 14 52.2	43.85	4.2	0 10 40.5	0.57	1.2756821	1.2814915	1.2799944	
13	240 20 43.0	43.84	-4.1	+0 10 35.9	-0.57	1.2757154	1.2784691	1.2769219	
21	240 26 33.8	43.84	4.1	0 10 31.3	0.58	1.2757487	1.2753603	1.2737924	
Mar. 1	240 32 24.5	43.83	4.1	0 10 26.7	0.58	1.2757820	1.2722254	1.2706678	
9	240 38 15.1	43.82	4.1	0 10 22.1	0.58	1.2758153	1.2691266	1.2676094	
17	240 44 5.7	43.82	4.0	0 10 17.5	0.58	1.2758486	1.2661235	1.2646767	
25	240 49 56.3	43.81	-4.0	+0 10 12.9	-0.58	1.2758819	1.2632771	1.2619326	
Apr. 2	240 55 46.8	43.81	4.0	0 10 8.3	0.58	1.2759153	1.2606503	1.2594372	
10	241 1 37.3	43.80	3.9	0 10 3.7	0.58	1.2759486	1.2582987	1.2572414	
18	241 7 27.7	43.80	3.9	0 9 59.1	0.58	1.2759820	1.2562713	1.2553945	
26	241 13 18.0	43.79	3.9	0 9 54.5	0.58	1.2760154	1.2546161	1.2539404	
May 4	241 19 8.4	43.78	-3.8	+0 9 49.9	-0.58	1.2760488	1.2533708	1.2529098	
12	241 24 58.6	43.78	3.8	0 9 45.3	0.58	1.2760822	1.2525602	1.2523239	
20	241 30 48.9	43.77	3.8	0 9 40.7	0.58	1.2761157	1.2522030	1.2521981	
28	241 36 39.0	43.77	3.8	0 9 36.0	0.58	1.2761491	1.2523087	1.2525339	
June 5	241 42 29.2	43.76	3.7	0 9 31.4	0.58	1.2761826	1.2528715	1.2533196	
13	241 48 19.2	43.75	-3.7	+0 9 26.8	-0.58	1.2762160	1.2538756	1.2545369	
21	241 54 9.3	43.75	3.7	0 9 22.2	0.58	1.2762495	1.2552999	1.2561599	
29	241 59 59.3	43.74	3.7	0 9 17.6	0.58	1.2762830	1.2571114	1.2581489	
July 7	242 5 49.2	43.74	3.6	0 9 13.0	0.58	1.2763165	1.2592665	1.2604590	
15	242 11 39.1	43.73	3.6	0 9 8.4	0.58	1.2763500	1.2617202	1.2630438	
23	242 17 28.9	43.72	-3.6	+0 9 3.7	-0.58	1.2763835	1.2644227	1.2658493	
31	242 23 18.7	43.72	3.5	0 8 59.1	0.58	1.2764170	1.2673163	1.2688167	
Aug. 8	242 29 8.4	43.71	3.5	0 8 54.5	0.58	1.2764505	1.2703438	1.2718909	
16	242 34 58.1	43.70	3.5	0 8 49.9	0.58	1.2764840	1.2734510	1.2750162	
24	242 40 47.7	43.70	3.5	0 8 45.3	0.58	1.2765175	1.2765796	1.2781336	
Sept. 1	242 46 37.3	43.69	-3.4	+0 8 40.6	-0.58	1.2765510	1.2796721	1.2811890	
9	242 52 26.8	43.68	3.4	0 8 36.0	0.58	1.2765846	1.2826781	1.2841334	
17	242 58 16.3	43.68	3.4	0 8 31.4	0.58	1.2766181	1.2855484	1.2869170	
25	243 4 5.7	43.67	3.3	0 8 26.8	0.58	1.2766516	1.2882337	1.2894935	
Oct. 3	243 9 55.1	43.66	3.3	0 8 22.1	0.58	1.2766852	1.2906919	1.2918250	
11	243 15 44.5	43.66	-3.3	+0 8 17.5	-0.58	1.2767187	1.2928878	1.2938760	
19	243 21 33.7	43.65	3.2	0 8 12.9	0.58	1.2767523	1.2947856	1.2956128	
27	243 27 23.0	43.65	3.2	0 8 8.2	0.58	1.2767858	1.2963546	1.2970092	
Nov. 4	243 33 12.1	43.64	3.2	0 8 3.6	0.58	1.2768194	1.2975740	1.2980466	
12	243 39 1.3	43.64	3.2	0 7 59.0	0.58	1.2768530	1.2984249	1.2987069	
20	243 44 50.4	43.63	-3.1	+0 7 54.4	-0.58	1.2768865	1.2988915	1.2989781	
28	243 50 39.4	43.62	3.1	0 7 49.7	0.58	1.2769201	1.2989667	1.2988576	
Dec. 6	243 56 28.4	43.62	3.1	0 7 45.1	0.58	1.2769537	1.2986508	1.2983462	
14	244 2 17.3	43.61	3.0	0 7 40.5	0.58	1.2769873	1.2979446	1.2974473	
22	244 8 6.2	43.61	3.0	0 7 35.8	0.58	1.2770209	1.2968568	1.2961754	
30	244 13 55.0	43.60	-3.0	+0 7 31.2	-0.58	1.2770545	1.2954057	1.2945503	
38	244 19 43.8	43.60	-3.0	+0 7 26.5	-0.58	1.2770881			

## NEPTUNE.

## GREENWICH MEAN NOON.

Date.	Heliocentric Longitude, Mean Equinox of Date.			Daily Motion.	Reduction to Orbit.	Heliocentric Latitude.			Daily Motion.	Logarithm of Radius Vector.	Logarithm of Distance from Earth—	
	°	'	"			°	'	"			At Date.	At Intermediate Date.
Jan. 4	81	16	11.1	21.95	-49.1	-1	21	3.7	+0.44	1.4751312	1.4618016	1.4622543
12	81	19	6.7	21.95	49.1	1	21	0.2	0.44	1.4751323	1.4627719	1.4633520
20	81	22	2.3	21.95	49.2	1	20	56.6	0.44	1.4751334	1.4639910	1.4646857
28	81	24	57.9	21.95	49.2	1	20	53.1	0.44	1.4751345	1.4654320	1.4662251
Feb. 5	81	27	53.5	21.95	49.2	1	20	49.5	0.44	1.4751357	1.4670606	1.4679338
13	81	30	49.1	21.95	-49.2	-1	20	46.0	+0.44	1.4751368	1.4688401	1.4697751
21	81	33	44.7	21.95	49.2	1	20	42.4	0.44	1.4751379	1.4707336	1.4717106
Mar. 1	81	36	40.3	21.95	49.2	1	20	38.9	0.44	1.4751391	1.4727009	1.4736990
9	81	39	35.8	21.95	49.2	1	20	35.3	0.44	1.4751402	1.4747006	1.4757012
17	81	42	31.4	21.95	49.2	1	20	31.8	0.45	1.4751413	1.4766958	1.4776795
25	81	45	27.0	21.94	-49.3	-1	20	28.2	+0.45	1.4751425	1.4786482	1.4795972
Apr. 2	81	48	22.5	21.94	49.3	1	20	24.6	0.45	1.4751437	1.4805227	1.4814203
10	81	51	18.1	21.94	49.3	1	20	21.1	0.45	1.4751448	1.4822868	1.4831188
18	81	54	13.6	21.94	49.3	1	20	17.5	0.45	1.4751460	1.4839128	1.4846653
26	81	57	9.2	21.94	49.3	1	20	13.9	0.45	1.4751472	1.4855374	1.4860345
May 4	82	0	4.7	21.94	-49.3	-1	20	10.3	+0.45	1.4751483	1.4866462	1.4872066
12	82	3	0.2	21.94	49.3	1	20	6.8	0.45	1.4751495	1.4877139	1.4881659
20	82	5	55.8	21.94	49.3	1	20	3.2	0.45	1.4751507	1.4885612	1.4888979
28	82	8	51.3	21.94	49.3	1	19	59.6	0.45	1.4751519	1.4891750	1.4893920
June 5	82	11	46.8	21.94	49.4	1	19	56.0	0.45	1.4751531	1.4895484	1.4896436
13	82	14	42.3	21.94	-49.4	-1	19	52.3	+0.45	1.4751543	1.4896774	1.4896495
21	82	17	37.8	21.94	49.4	1	19	48.8	0.45	1.4751555	1.4895598	1.4894086
29	82	20	33.3	21.94	49.4	1	19	45.2	0.45	1.4751567	1.4891971	1.4889264
July 7	82	23	28.8	21.94	49.4	1	19	41.6	0.45	1.4751579	1.4885973	1.4882101
15	82	26	24.3	21.94	49.4	1	19	38.0	0.45	1.4751592	1.4877667	1.4872686
23	82	29	19.8	21.94	-49.4	-1	19	34.3	+0.45	1.4751604	1.4867179	1.4861163
31	82	32	15.3	21.93	49.4	1	19	30.7	0.45	1.4751616	1.4854665	1.4847709
Aug. 8	82	35	10.8	21.93	49.4	1	19	27.1	0.45	1.4751628	1.4840320	1.4832523
16	82	38	6.2	21.93	49.4	1	19	23.5	0.45	1.4751641	1.4824347	1.4815823
24	82	41	1.7	21.93	49.5	1	19	19.9	0.45	1.4751653	1.4806990	1.4797888
Sept. 1	82	43	57.2	21.93	-49.5	-1	19	16.2	+0.45	1.4751665	1.4788552	1.4779018
9	82	46	52.6	21.93	49.5	1	19	12.6	0.45	1.4751678	1.4769328	1.4759521
17	82	49	48.1	21.93	49.5	1	19	9.0	0.45	1.4751691	1.4749645	1.4739745
25	82	52	43.5	21.93	49.5	1	19	5.3	0.45	1.4751703	1.4729868	1.4720065
Oct. 3	82	55	39.0	21.93	49.5	1	19	1.7	0.46	1.4751716	1.4710377	1.4700846
11	82	58	34.4	21.93	-49.5	-1	18	58.0	+0.46	1.4751729	1.4691526	1.4682467
19	83	1	29.8	21.93	49.5	1	18	54.4	0.46	1.4751741	1.4673716	1.4665324
27	83	4	25.3	21.93	49.5	1	18	50.7	0.46	1.4751754	1.4657332	1.4649787
Nov. 4	83	7	20.7	21.93	49.5	1	18	47.1	0.46	1.4751767	1.4642727	1.4636191
12	83	10	16.1	21.93	49.5	1	18	43.4	0.46	1.4751780	1.4630218	1.4624848
20	83	13	11.5	21.93	-49.6	-1	18	39.8	+0.46	1.4751793	1.4620119	1.4616054
28	83	16	6.9	21.93	49.6	1	18	36.1	0.46	1.4751807	1.4612674	1.4610001
Dec. 6	83	19	2.3	21.93	49.6	1	18	32.4	0.46	1.4751820	1.4608048	1.4606837
14	83	21	57.7	21.92	49.6	1	18	28.8	0.46	1.4751833	1.4606375	1.4606664
22	83	24	53.1	21.92	49.6	1	18	25.1	0.46	1.4751846	1.4607704	1.4609488
30	83	27	48.5	21.92	-49.6	-1	18	21.4	+0.46	1.4751860	1.4612004	1.4615237
38	83	30	43.9	21.92	49.6	-1	18	17.7	+0.46	1.4751873		

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Jan. 1	+0.1904353	+0.1990071	-737	-0.8849566	-0.8833656	-206	-0.3839339	-0.3832436	+108
2	0.2075631	0.2161026	743	0.8817059	0.8799780	220	0.3825238	0.3817742	102
3	0.2246251	0.2331298	749	0.8781820	0.8763177	234	0.3809951	0.3801865	95
4	0.2416162	0.2500832	755	0.8743855	0.8723857	248	0.3793484	0.3784810	88
5	0.2585310	0.2669583	760	0.8703183	0.8681836	262	0.3775843	0.3766585	81
6	+0.2753649	+0.2837503	-764	-0.8659817	-0.8637128	-276	-0.3757036	-0.3747196	+74
7	0.2921136	0.3004540	768	0.8613771	0.8589747	290	0.3737066	0.3726647	67
8	0.3087712	0.3170647	772	0.8565058	0.8539708	305	0.3715939	0.3704943	60
9	0.3253338	0.3335778	776	0.8513693	0.8487021	320	0.3693660	0.3682092	53
10	0.3417961	0.3499881	779	0.8459691	0.8431707	335	0.3670239	0.3658101	46
11	+0.3581533	+0.3662911	-782	-0.8403068	-0.8373774	-350	-0.3645678	-0.3632972	+38
12	0.3744008	0.3824818	784	0.8343830	0.8313242	365	0.3619983	0.3606715	30
13	0.3905335	0.3985551	786	0.8282009	0.8250130	380	0.3593166	0.3579337	22
14	0.4065461	0.4145060	787	0.8217608	0.8184447	395	0.3565228	0.3550842	14
15	0.4224340	0.4303294	788	0.8150648	0.8116214	411	0.3536178	0.3521238	+6
16	+0.4381917	+0.4460204	-788	-0.8081148	-0.8045454	-427	-0.3506024	-0.3490537	-2
17	0.4538149	0.4615745	788	0.8009132	0.7972182	442	0.3474777	0.3458745	10
18	0.4692984	0.4769857	788	0.7934609	0.7896416	458	0.3442443	0.3425870	18
19	0.4846361	0.4922490	788	0.7857607	0.7818188	474	0.3409030	0.3391925	27
20	0.4998238	0.5073598	787	0.7778160	0.7737524	490	0.3374556	0.3356923	36
21	+0.5148564	+0.5223127	-785	-0.7696284	-0.7654439	-506	-0.3339028	-0.3320871	-44
22	0.5297283	0.5371026	783	0.7611997	0.7568962	522	0.3302454	0.3283780	52
23	0.5444351	0.5517252	780	0.7525339	0.7481131	538	0.3264851	0.3245668	61
24	0.5589723	0.5661754	777	0.7436340	0.7390965	555	0.3226233	0.3206545	70
25	0.5733343	0.5804487	774	0.7345017	0.7298505	571	0.3186608	0.3166427	78
26	+0.5875177	+0.5945405	-770	-0.7251428	-0.7203784	-587	-0.3146001	-0.3125330	-87
27	0.6015169	0.6084464	766	0.7155582	0.7106827	603	0.3104416	0.3083264	96
28	0.6153285	0.6221624	761	0.7057525	0.7007677	619	0.3061873	0.3040247	105
29	0.6289478	0.6356841	756	0.6957289	0.6906364	635	0.3018386	0.2996293	113
30	0.6423710	0.6490080	750	0.6854907	0.6802920	651	0.2973969	0.2951416	122
31	+0.6555947	+0.6621304	-744	-0.6750410	-0.6697384	-667	-0.2928636	-0.2905634	-130
Feb. 1	0.6686148	0.6750474	737	0.6643844	0.6589796	683	0.2882409	0.2858963	139
2	0.6814279	0.6877558	730	0.6535242	0.6480184	699	0.2835298	0.2811415	148
3	0.6940305	0.7002513	723	0.6424629	0.6368585	715	0.2787315	0.2763004	157
4	0.7064182	0.7125313	715	0.6312053	0.6255034	730	0.2738481	0.2713746	166
5	+0.7185897	+0.7245928	-707	-0.6197536	-0.6139566	-745	-0.2688805	-0.2663658	-175
6	0.7305402	0.7364316	698	0.6081126	0.6022217	760	0.2638308	0.2612754	184
7	0.7422667	0.7480450	689	0.5962846	0.5903020	775	0.2586999	0.2561046	193
8	0.7537660	0.7594294	680	0.5842740	0.5782009	790	0.2534896	0.2508549	202
9	0.7650348	0.7705817	670	0.5720834	0.5659222	805	0.2482011	0.2455282	212
10	+0.7760698	+0.7814987	-659	-0.5597176	-0.5534694	-819	-0.2428364	-0.2401258	-221
11	0.7868678	0.7921766	648	0.5471786	0.5408458	833	0.2373966	0.2346490	230
12	0.7974249	0.8026123	636	0.5344712	0.5280553	847	0.2318833	0.2290997	239
13	0.8077385	0.8128030	624	0.5215986	0.5151018	861	0.2262984	0.2234796	248
14	0.8178053	0.8227450	612	0.5085651	0.5019887	875	0.2206434	0.2177900	257
15	+0.8276217	+0.8324350	-599	-0.4953734	-0.4887202	-888	-0.2149198	-0.2120330	-266
16	0.8371846	0.8418702	-586	-0.4820292	-0.4753005	-901	-0.2091298	-0.2062102	-275



## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. o.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Feb. 16	+0.8371846	+0.8418702	-586	-0.4820292	-0.4753005	-901	-0.2091298	-0.2062102	-275
17	0.8464912	0.8510471	573	0.4685351	0.4617337	914	0.2032747	0.2003236	283
18	0.8555378	0.8599630	559	0.4548966	0.4480241	927	0.1973571	0.1943751	292
19	0.8643222	0.8686151	545	0.4411171	0.4341762	940	0.1913780	0.1883663	300
20	0.8728412	0.8770002	531	0.4272019	0.4201946	952	0.1853402	0.1822998	309
21	+0.8810918	+0.8851158	-516	-0.4131551	-0.4060839	-964	-0.1792455	-0.1761774	-317
22	0.8890719	0.8929596	501	0.3989817	0.3918489	976	0.1730959	0.1700011	326
23	0.8967788	0.9005291	485	0.3846862	0.3774946	988	0.1668935	0.1637734	335
24	0.9042104	0.9078226	469	0.3702742	0.3630250	999	0.1606408	0.1574956	343
25	0.9113653	0.9148381	453	0.3557481	0.3484446	1010	0.1543385	0.1511699	351
26	+0.9182409	+0.9215736	-437	-0.3411150	-0.3337599	-1021	-0.1479901	-0.1447992	-359
27	0.9248360	0.9280278	420	0.3263797	0.3189745	1032	0.1415975	0.1383850	367
28	0.9311489	0.9341989	403	0.3115454	0.3040932	1042	0.1351621	0.1319292	375
Mar. 1	0.9371778	0.9400856	386	0.2966183	0.2891212	1052	0.1286865	0.1254342	383
2	0.9429221	0.9456871	368	0.2816025	0.2740630	1061	0.1221725	0.1189018	391
3	+0.9483804	+0.9510020	-350	-0.2665030	-0.2589232	-1070	-0.1156222	-0.1123341	-399
4	0.9535518	0.9560296	331	0.2513240	0.2437059	1079	0.1090376	0.1057327	406
5	0.9584353	0.9607686	312	0.2360696	0.2284160	1087	0.1024200	0.0990999	413
6	0.9630296	0.9652181	293	0.2207454	0.2130580	1095	0.0957723	0.0924374	421
7	0.9673339	0.9693770	274	0.2053546	0.1976360	1103	0.0890955	0.0857470	428
8	+0.9713473	+0.9732446	-254	-0.1899025	-0.1821548	-1111	-0.0823920	-0.0790308	-435
9	0.9750689	0.9768202	234	0.1743933	0.1666185	1118	0.0756636	0.0722906	442
10	0.9784982	0.9801027	214	0.1588311	0.1510316	1125	0.0689121	0.0655283	449
11	0.9816336	0.9830909	194	0.1432206	0.1353987	1132	0.0621394	0.0587458	456
12	0.9844744	0.9857840	173	0.1275664	0.1197240	1139	0.0553476	0.0519450	463
13	+0.9870198	+0.9881817	-152	-0.1118722	-0.1040116	-1145	-0.0485383	-0.0451278	-469
14	0.9892695	0.9902828	131	0.0961430	0.0882670	1151	0.0417137	0.0382964	476
15	0.9912219	0.9920868	110	0.0803841	0.0724945	1156	0.0348761	0.0314529	482
16	0.9928773	0.9935930	89	0.0645990	0.0566984	1161	0.0280271	0.0245991	488
17	0.9942340	0.9948004	67	0.0487932	0.0408842	1166	0.0211691	0.0177374	494
18	+0.9952920	+0.9957090	-45	-0.0329719	-0.0250567	-1170	-0.0143043	-0.0108698	-500
19	0.9960511	0.9963182	23	0.0171392	-0.0092201	1174	0.0074345	-0.0039985	506
20	0.9965105	0.9966281	-1	-0.0013002	+0.0066199	1178	-0.0005622	+0.0028742	512
21	0.9966709	0.9966387	+21	+0.0145395	0.0224582	1182	+0.0063103	0.0097460	517
22	0.9965316	0.9963498	43	0.0303754	0.0382906	1185	0.0131811	0.0166152	522
23	+0.9960933	+0.9957620	+66	+0.0462029	+0.0541112	-1187	+0.0200480	+0.0234791	-527
24	0.9953561	0.9948756	89	0.0620154	0.0699151	1189	0.0269083	0.0303356	532
25	0.9943207	0.9936917	112	0.0778095	0.0856977	1190	0.0337606	0.0371827	536
26	0.9929884	0.9922109	135	0.0935792	0.1014533	1191	0.0406019	0.0440179	540
27	0.9913593	0.9904339	158	0.1093196	0.1171776	1192	0.0474305	0.0508394	544
28	+0.9894348	+0.9883620	+181	+0.1250266	+0.1328655	-1193	+0.0542444	+0.0576450	-548
29	0.9872159	0.9859969	205	0.1406943	0.1485127	1194	0.0610412	0.0644329	552
30	0.9847048	0.9833395	228	0.1563198	0.1641148	1194	0.0678197	0.0712012	556
31	0.9819014	0.9803910	252	0.1718973	0.1796667	1194	0.0745772	0.0779476	560
32	0.9788082	0.9771533	276	0.1874225	0.1951642	1193	0.0813121	0.0846705	563
33	+0.9754264	+0.9736278	+300	+0.2028912	+0.2106029	-1192	+0.0880225	+0.0913679	-566
34	+0.9717576	+0.9698158	+324	+0.2182988	+0.2259785	-1191	+0.0947065	+0.0980380	-569

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. o.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. o.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Apr. 1	+0.9788082	+0.9771533	+ 276	+0.1874225	+0.1951642	-1193	+0.0813121	+0.0846705	-563
2	0.9754264	0.9736278	300	0.2028912	0.2106029	1192	0.0880225	0.0913679	566
3	0.9717576	0.9698158	324	0.2182988	0.2259785	1191	0.0947065	0.0980380	569
4	0.9678027	0.9657185	348	0.2336413	0.2412867	1189	0.1013623	0.1046790	572
5	0.9635638	0.9613384	372	0.2489142	0.2565236	1187	0.1079881	0.1112894	575
6	+0.9590427	+0.9566766	+ 396	+0.2641142	+0.2716852	-1185	+0.1145825	+0.1178672	-577
7	0.9542404	0.9517341	420	0.2792364	0.2867676	1183	0.1211433	0.1244107	579
8	0.9491580	0.9465126	444	0.2942779	0.3017666	1180	0.1276690	0.1309180	581
9	0.9437980	0.9410141	468	0.3092332	0.3166772	1177	0.1341576	0.1373874	583
10	0.9381613	0.9352398	493	0.3240984	0.3314965	1174	0.1406073	0.1438172	585
11	+0.9322498	+0.9291912	+ 517	+0.3388706	+0.3462201	-1170	+0.1470168	+0.1502056	-586
12	0.9260645	0.9228698	542	0.3535445	0.3608434	1166	0.1533836	0.1565506	587
13	0.9196074	0.9162779	566	0.3681163	0.3753626	1161	0.1597062	0.1628503	588
14	0.9128811	0.9094170	591	0.3825818	0.3897731	1155	0.1659826	0.1691029	589
15	0.9058860	0.9022887	615	0.3969362	0.4040705	1149	0.1722109	0.1753065	590
16	+0.8986252	+0.8948957	+ 640	+0.4111756	+0.4182509	-1143	+0.1783893	+0.1814591	-590
17	0.8911004	0.8872395	665	0.4252958	0.4323098	1137	0.1845157	0.1875588	589
18	0.8833134	0.8793228	690	0.4392923	0.4462428	1131	0.1905882	0.1936039	589
19	0.8752676	0.8711480	715	0.4531608	0.4600456	1124	0.1966054	0.1995924	589
20	0.8669646	0.8627177	740	0.4668968	0.4737141	1117	0.2025648	0.2055224	589
21	+0.8584076	+0.8540348	+ 765	+0.4804968	+0.4872442	-1110	+0.2084649	+0.2113922	-588
22	0.8495996	0.8451023	789	0.4939560	0.5006316	1102	0.2143039	0.2171998	586
23	0.8405433	0.8359229	814	0.5072704	0.5138719	1094	0.2200798	0.2229435	584
24	0.8312417	0.8265002	839	0.5204358	0.5269617	1085	0.2257909	0.2286219	582
25	0.8216987	0.8168378	863	0.5334491	0.5398972	1076	0.2314361	0.2342332	580
26	+0.8119177	+0.8069385	+ 887	+0.5463058	+0.5526747	-1067	+0.2370131	+0.2397758	-578
27	0.8019009	0.7968055	912	0.5590032	0.5652908	1057	0.2425210	0.2452485	576
28	0.7916527	0.7864426	936	0.5715371	0.5777417	1047	0.2479580	0.2506494	574
29	0.7811760	0.7758534	961	0.5839042	0.5900242	1037	0.2533226	0.2559774	571
30	0.7704751	0.7650413	985	0.5961013	0.6021354	1026	0.2586137	0.2612313	568
May 1	+0.7595526	+0.7540095	+1010	+0.6081258	+0.6140720	-1015	+0.2638300	+0.2664095	-565
2	0.7484124	0.7427617	1034	0.6199739	0.6258311	1004	0.2689697	0.2715106	562
3	0.7370578	0.7313013	1058	0.6316433	0.6374101	992	0.2740321	0.2765339	558
4	0.7254925	0.7196318	1082	0.6431310	0.6488057	980	0.2790159	0.2814777	554
5	0.7137195	0.7077560	1106	0.6544337	0.6600146	967	0.2839194	0.2863408	550
6	+0.7017419	+0.6956776	+1130	+0.6655484	+0.6710350	- 954	+0.2887418	+0.2911222	-546
7	0.6895635	0.6834002	1154	0.6764737	0.6818638	941	0.2934819	0.2958206	542
8	0.6771878	0.6709265	1177	0.6872053	0.6924980	927	0.2981383	0.3004347	537
9	0.6646171	0.6582602	1201	0.6977414	0.7029348	913	0.3027097	0.3049631	532
10	0.6518561	0.6454051	1224	0.7080781	0.7131711	898	0.3071948	0.3094047	527
11	+0.6389076	+0.6323643	+1247	+0.7182132	+0.7232042	- 883	+0.3115926	+0.3137582	-521
12	0.6257753	0.6191409	1270	0.7281436	0.7330310	868	0.3159014	0.3180221	515
13	0.6124618	0.6057388	1293	0.7378662	0.7428489	852	0.3201201	0.3221952	509
14	0.5989721	0.5921620	1316	0.7473786	0.7520549	836	0.3242473	0.3262763	503
15	0.5853092	0.5784142	1339	0.7566776	0.7612463	820	0.3282819	0.3302639	496
16	+0.5714774	+0.5644994	+1361	+0.7657606	+0.7702202	- 803	+0.3322226	+0.3341575	-489
17	+0.5574806	+0.5504216	+1383	+0.7746248	+0.7789739	- 786	+0.3360685	+0.3379551	-482

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
May 17	+0.5574806	+0.5504216	+1383	+0.7746248	+0.7789739	-786	+0.3360685	+0.3379551	-482
18	0.5433230	0.5361853	1405	0.7832671	0.7875041	769	0.3398175	0.3416557	475
19	0.5290090	0.5217948	1427	0.7916847	0.7958086	751	0.3434693	0.3452581	467
20	0.5145432	0.5072545	1449	0.7998755	0.8038850	733	0.3470222	0.3487615	459
21	0.4999293	0.4925683	1470	0.8078370	0.8117311	714	0.3504758	0.3521648	451
22	+0.4851721	+0.4777413	+1491	+0.8155672	+0.8193446	-695	+0.3538286	+0.3554670	-443
23	0.4702766	0.4627784	1512	0.8230634	0.8267231	675	0.3570799	0.3586673	434
24	0.4552475	0.4476845	1532	0.8303236	0.8338646	655	0.3602290	0.3617648	425
25	0.4400898	0.4324635	1552	0.8373459	0.8407675	634	0.3632748	0.3647588	416
26	0.4248067	0.4171204	1572	0.8441290	0.8474302	613	0.3662168	0.3676486	407
27	+0.4094049	+0.4016603	+1592	+0.8506710	+0.8538514	-592	+0.3690543	+0.3704338	-398
28	0.3938876	0.3860875	1611	0.8569710	0.8600292	571	0.3717869	0.3731134	389
29	0.3782604	0.3704067	1630	0.8630261	0.8659624	549	0.3744135	0.3756872	380
30	0.3625271	0.3546220	1649	0.8688372	0.8716500	527	0.3769342	0.3781544	371
31	0.3466923	0.3387388	1668	0.8744010	0.8770902	504	0.3793479	0.3805146	361
June 1	+0.3307617	+0.3227608	+1687	+0.8797175	+0.8822827	-481	+0.3816545	+0.3827674	-351
2	0.3147373	0.3066924	1705	0.8847857	0.8872261	458	0.3838533	0.3849122	341
3	0.2986261	0.2905383	1723	0.8896040	0.8919191	434	0.3859440	0.3869486	331
4	0.2824300	0.2743019	1740	0.8941715	0.8963611	410	0.3879260	0.3888762	320
5	0.2661545	0.2579885	1757	0.8984876	0.9005506	386	0.3897990	0.3906940	309
6	+0.2498042	+0.2416019	+1774	+0.9025502	+0.9044867	-361	+0.3915616	+0.3924022	-298
7	0.2333824	0.2251466	1790	0.9063596	0.9081684	336	0.3932153	0.3940005	287
8	0.2168946	0.2086268	1806	0.9099134	0.9115946	311	0.3947579	0.3954875	276
9	0.2003439	0.1920464	1822	0.9132116	0.9147640	285	0.3961893	0.3968631	264
10	0.1837352	0.1754109	1837	0.9162523	0.9176760	258	0.3975089	0.3981269	252
11	+0.1670740	+0.1587246	+1851	+0.9190353	+0.9203296	-231	+0.3987168	+0.3992784	-240
12	0.1503635	0.1419915	1865	0.9215590	0.9227234	204	0.3998117	0.4003170	228
13	0.1336091	0.1252169	1878	0.9238226	0.9248563	177	0.4007940	0.4012425	215
14	0.1168155	0.1084053	1891	0.9258245	0.9267274	149	0.4016625	0.4020542	203
15	0.0999872	0.0915618	1903	0.9275647	0.9283363	121	0.4024174	0.4027519	191
16	+0.0831297	+0.0746912	+1915	+0.9290423	+0.9296828	-93	+0.4030579	+0.4033356	-178
17	0.0662473	0.0577988	1926	0.9302575	0.9307659	65	0.4035846	0.4038048	165
18	0.0493461	0.0408898	1937	0.9312080	0.9315844	36	0.4039962	0.4041592	152
19	0.0324306	0.0239689	1947	0.9318949	0.9321392	-7	0.4042935	0.4043991	139
20	+0.0155056	+0.0070416	1957	0.9323174	0.9324295	+22	0.4044761	0.4045244	126
21	-0.0014227	-0.0098869	+1967	+0.9324756	+0.9324556	+52	+0.4045440	+0.4045350	-112
22	0.0183503	0.0268122	1976	0.9323696	0.9322178	82	0.4044973	0.4044310	99
23	0.0352719	0.0437289	1984	0.9320000	0.9317163	112	0.4043362	0.4042129	85
24	0.0521823	0.0606314	1992	0.9313668	0.9309516	142	0.4040610	0.4038806	71
25	0.0690758	0.0775152	1999	0.9304706	0.9299239	173	0.4036718	0.4034345	57
26	-0.0859487	-0.0943758	+2006	+0.9293117	+0.9286339	+204	+0.4031688	+0.4028746	-43
27	0.1027958	0.1112084	2012	0.9278908	0.9270828	235	0.4025522	0.4022017	29
28	0.1196127	0.1280081	2018	0.9262098	0.9252716	267	0.4018230	0.4014161	15
29	0.1363941	0.1447702	2023	0.9242684	0.9232003	299	0.4009810	0.4005177	-1
30	0.1531360	0.1614910	2027	0.9220675	0.9208703	331	0.4000264	0.3995073	+13
31	-0.1698344	-0.1781654	+2030	+0.9196086	+0.9182825	+363	+0.3989602	+0.3983851	+27
32	-0.1864838	-0.1947890	+2032	+0.9168920	+0.9154373	+395	+0.3977822	+0.3971515	+42

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Data.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.		
July	1	-0.1698344	-0.1781654	+2030	+0.9196086	+0.9182825	+ 363	+0.3989602	+0.3983851	+ 27
	2	0.1864838	0.1947890	2032	0.9168920	0.9154373	395	0.3977822	0.3971515	42
	3	0.2030806	0.2113579	2034	0.9139185	0.9123357	428	0.3964930	0.3958067	57
	4	0.2196204	0.2278676	2036	0.9106891	0.9089788	460	0.3950927	0.3943510	71
	5	0.2360990	0.2443140	2037	0.9072049	0.9053674	493	0.3935817	0.3927849	86
	6	-0.2525121	-0.2606926	+2036	+0.9034665	+0.9015022	+ 526	+0.3919606	+0.3911087	+101
	7	0.2688550	0.2769987	2035	0.8994746	0.8973841	559	0.3902293	0.3893226	116
	8	0.2851233	0.2932285	2034	0.8952306	0.8930140	592	0.3883886	0.3874272	131
	9	0.3013134	0.3093774	2032	0.8907346	0.8883926	625	0.3864385	0.3854225	146
	10	0.3174199	0.3254405	2029	0.8859882	0.8835215	658	0.3843794	0.3833093	161
	11	-0.3334386	-0.3414137	+2026	+0.8809925	+0.8784013	+ 691	+0.3822121	+0.3810879	+176
	12	0.3493652	0.3572923	2022	0.8757481	0.8730328	724	0.3799367	0.3787586	191
	13	0.3651945	0.3730711	2017	0.8702558	0.8674172	757	0.3775536	0.3763220	206
	14	0.3809217	0.3887458	2012	0.8645173	0.8615561	790	0.3750637	0.3737787	221
	15	0.3965427	0.4043117	2006	0.8585338	0.8554507	824	0.3724672	0.3711294	236
	16	-0.4120523	-0.4197637	+1999	+0.8523069	+0.8491025	+ 857	+0.3697652	+0.3683747	+251
	17	0.4274455	0.4350973	1992	0.8458380	0.8425138	890	0.3669581	0.3655155	266
	18	0.4427183	0.4503077	1984	0.8391299	0.8356861	924	0.3640470	0.3625526	281
	19	0.4578652	0.4653903	1976	0.8321830	0.8286213	958	0.3610326	0.3594870	297
	20	0.4728823	0.4803405	1966	0.8250008	0.8213214	991	0.3579159	0.3563194	312
	21	-0.4877645	-0.4951537	+1955	+0.8175838	+0.8137886	+1024	+0.3546977	+0.3530510	+327
	22	0.5025077	0.5098258	1944	0.8099360	0.8060261	1057	0.3513794	0.3496830	342
	23	0.5171076	0.5243525	1932	0.8020592	0.7980355	1090	0.3479619	0.3462162	357
	24	0.5315599	0.5387292	1919	0.7939554	0.7898193	1123	0.3444460	0.3426516	373
	25	0.5458600	0.5529519	1905	0.7856276	0.7813809	1156	0.3408331	0.3389908	388
	26	-0.5600046	-0.5670177	+1891	+0.7770792	+0.7727222	+1188	+0.3371247	+0.3352347	+403
	27	0.5739904	0.5809219	1876	0.7683108	0.7638457	1220	0.3333211	0.3313842	418
	28	0.5878120	0.5946604	1860	0.7593270	0.7547549	1252	0.3294241	0.3274408	433
	29	0.6014666	0.6082306	1843	0.7501297	0.7454520	1284	0.3254345	0.3234055	448
	30	0.6149515	0.6216286	1826	0.7407218	0.7359394	1316	0.3213537	0.3192793	463
Aug.	31	-0.6282617	-0.6348906	+1809	+0.7311052	+0.7262197	+1347	+0.3171824	+0.3150633	+477
	1	0.6413947	0.6478936	1791	0.7212833	0.7162963	1378	0.3129221	0.3107588	492
	2	0.6543467	0.6607537	1772	0.7112588	0.7061710	1409	0.3085737	0.3063668	506
	3	0.6671142	0.6734280	1752	0.7010334	0.6958466	1440	0.3041382	0.3018882	520
	4	0.6796945	0.6859128	1731	0.6906106	0.6853254	1471	0.2996169	0.2973242	534
	5	-0.6920829	-0.6982045	+1709	+0.6799918	+0.6746105	+1501	+0.2950105	+0.2926760	+549
	6	0.7042768	0.7102993	1687	0.6691815	0.6637046	1531	0.2903207	0.2879447	564
	7	0.7162717	0.7221940	1665	0.6581805	0.6526097	1561	0.2855482	0.2831313	578
	8	0.7280654	0.7338853	1642	0.6469924	0.6413291	1590	0.2806943	0.2782372	592
	9	0.7396533	0.7453691	1619	0.6356201	0.6298655	1618	0.2757603	0.2732635	606
	10	-0.7510321	-0.7566420	+1595	+0.6240658	+0.6182216	+1646	+0.2707472	+0.2682115	+620
	11	0.7621982	0.7677005	1570	0.6123331	0.6064003	1674	0.2656565	0.2630824	634
	12	0.7731482	0.7785409	1544	0.6004241	0.5944052	1702	0.2604894	0.2578778	648
	13	0.7838782	0.7891595	1518	0.5883437	0.5822398	1729	0.2552477	0.2525992	661
	14	0.7943845	0.7995530	1491	0.5760939	0.5699066	1756	0.2499325	0.2472479	674
	15	-0.8046644	-0.8097179	+1462	+0.5636783	+0.5574096	+1783	+0.2445455	+0.2418256	+687
16	-0.8147139	-0.8196512	+1432	+0.5511008	+0.5447523	+1809	+0.2390883	+0.2363337	+700	

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Aug. 16	-0.8147139	-0.8196512	+1432	+0.5511008	+0.5447523	+1809	+0.2390883	+0.2363337	+ 700
17	0.8245296	0.8293486	1402	0.5383647	0.5319386	1835	0.2335622	0.2307741	713
18	0.8341081	0.8388080	1372	0.5254745	0.5189727	1861	0.2279695	0.2251487	726
19	0.8434476	0.8480259	1341	0.5124337	0.5058576	1886	0.2223117	0.2194586	738
20	0.8525431	0.8569994	1309	0.4992453	0.4925978	1910	0.2165899	0.2137059	750
21	-0.8613941	-0.8657268	+1277	+0.4859151	+0.4791973	+1933	+0.2108067	+0.2078923	+ 762
22	0.8699972	0.8742049	1244	0.4724453	0.4656603	1956	0.2049632	0.2020197	774
23	0.8783496	0.8824311	1211	0.4588422	0.4519911	1978	0.1990619	0.1960899	786
24	0.8864490	0.8904032	1178	0.4451078	0.4381929	2000	0.1931039	0.1901042	797
25	0.8942933	0.8981191	1144	0.4312470	0.4242706	2021	0.1870911	0.1840648	808
26	-0.9018804	-0.9055772	+1110	+0.4172642	+0.4102282	+2042	+0.1810254	+0.1779733	+ 819
27	0.9092090	0.9127753	1075	0.4031631	0.3960695	2063	0.1749085	0.1718314	830
28	0.9162762	0.9197116	1040	0.3889477	0.3817980	2084	0.1687420	0.1656405	841
29	0.9230811	0.9263840	1004	0.3746212	0.3674180	2104	0.1625273	0.1594026	852
30	0.9296204	0.9327905	967	0.3601887	0.3529337	2123	0.1562665	0.1531192	862
31	-0.9358941	-0.9389304	+ 929	+0.3456536	+0.3383488	+2142	+0.1499610	+0.1467921	+ 872
Sept. 1	0.9418993	0.9448007	891	0.3310198	0.3236668	2160	0.1436126	0.1404227	882
2	0.9476343	0.9504000	853	0.3162904	0.3088913	2177	0.1372227	0.1340128	892
3	0.9530976	0.9557267	815	0.3014699	0.2940269	2193	0.1307932	0.1275641	901
4	0.9582872	0.9607788	776	0.2865625	0.2790771	2208	0.1243256	0.1210780	910
5	-0.9632013	-0.9655545	+ 737	+0.2715714	+0.2640462	+2222	+0.1178215	+0.1145567	+ 919
6	0.9678382	0.9700523	698	0.2565017	0.2489379	2235	0.1112834	0.1080016	928
7	0.9721964	0.9742703	658	0.2413557	0.2337560	2248	0.1047118	0.1014144	936
8	0.9762736	0.9782060	618	0.2261391	0.2185052	2261	0.0981096	0.0947974	944
9	0.9800675	0.9818581	577	0.2108550	0.2031892	2273	0.0914782	0.0881521	952
10	-0.9835775	-0.9852253	+ 536	+0.1955084	+0.1878132	+2284	+0.0848194	+0.0814805	+ 960
11	0.9868014	0.9883057	495	0.1801040	0.1723811	2295	0.0781356	0.0747848	967
12	0.9897380	0.9910980	454	0.1646454	0.1568978	2306	0.0714285	0.0680669	974
13	0.9923857	0.9936009	412	0.1491385	0.1413677	2316	0.0647003	0.0613288	981
14	0.9947433	0.9958128	370	0.1335864	0.1257955	2325	0.0579527	0.0545725	988
15	-0.9968093	-0.9977330	+ 328	+0.1179954	+0.1101862	+2334	+0.0511883	+0.0478003	+ 994
16	0.9985837	0.9993610	285	0.1023690	0.0945447	2342	0.0444088	0.0410143	1000
17	1.0000650	1.0006955	242	0.0867135	0.0788758	2350	0.0376168	0.0342165	1006
18	1.0012525	1.0017361	199	0.0710324	0.0631842	2357	0.0308138	0.0274091	1011
19	1.0021462	1.0024828	155	0.0553315	0.0474749	2363	0.0240025	0.0205941	1016
20	-1.0027457	-1.0029350	+ 111	+0.0396151	+0.0317528	+2368	+0.0171844	+0.0137737	+1021
21	1.0030506	1.0030927	67	0.0238885	0.0160228	2372	0.0103621	0.0069499	1025
22	1.0030612	1.0029562	+ 23	+0.0081562	+0.0002894	2375	+0.0035374	+0.0001248	1029
23	1.0027776	1.0025252	- 21	-0.0075771	-0.0154426	2377	-0.0032876	-0.0066996	1033
24	1.0021993	1.0018003	66	0.0233066	0.0311689	2378	0.0101110	0.0135216	1037
25	-1.0013279	-1.0007820	- 111	-0.0390282	-0.0468841	+2379	-0.0169310	-0.0203389	+1040
26	1.0001628	0.9994702	155	0.0547363	0.0625844	2380	0.0237452	0.0271498	1043
27	0.9987043	0.9978654	200	0.0704277	0.0782655	2379	0.0305523	0.0339524	1045
28	0.9969533	0.9959681	245	0.0860973	0.0939229	2378	0.0373499	0.0407448	1047
29	0.9949100	0.9937791	290	0.1017414	0.1095521	2376	0.0441367	0.0475252	1049
30	-0.9925752	-0.9912982	- 335	-0.1173547	-0.1251490	+2374	-0.0509102	-0.0542917	+1051
31	-0.9899484	-0.9885262	- 380	-0.1329341	-0.1407091	+2372	-0.0576692	-0.0610424	+1052

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Y True Equinox.		Reduc. to Mean Eq'x of Jan. 0.	Z True Equinox.		Reduc. to Mean Eq'x of Jan. 0.
	Noon.	Midnight.		Noon.	Midnight.		Noon.	Midnight.	
Oct. 1	-0.9899484	-0.9885262	- 380	-0.1329341	-0.1407091	+2372	-0.0576692	-0.0610424	+1052
2	0.9870314	0.9854641	426	0.1484738	0.1562278	2370	0.0644112	0.0677754	1053
3	0.9838238	0.9821111	472	0.1639706	0.1717016	2367	0.0711347	0.0744889	1054
4	0.9803259	0.9784684	518	0.1794203	0.1871259	2362	0.0778378	0.0811810	1054
5	0.9765386	0.9745363	563	0.1948179	0.2024960	2356	0.0845184	0.0878498	1054
6	-0.9724618	-0.9703153	- 608	-0.2101595	-0.2178075	+2349	-0.0911749	-0.0944932	+1053
7	0.9680967	0.9658063	653	0.2254396	0.2330554	2342	0.0978047	0.1011091	1052
8	0.9634440	0.9610100	698	0.2406542	0.2482356	2334	0.1044061	0.1076955	1051
9	0.9585044	0.9559272	743	0.2557989	0.2633435	2325	0.1109770	0.1142504	1049
10	0.9532785	0.9505584	788	0.2708688	0.2783743	2316	0.1175155	0.1207719	1047
11	-0.9477672	-0.9449050	- 833	-0.2858593	-0.2933231	+2306	-0.1240194	-0.1272577	+1045
12	0.9419720	0.9389685	878	0.3007652	0.3081849	2295	0.1304866	0.1337057	1042
13	0.9358946	0.9327504	923	0.3155817	0.3229550	2284	0.1369147	0.1401135	1039
14	0.9295362	0.9262522	968	0.3303041	0.3376285	2272	0.1433018	0.1464794	1036
15	0.9228985	0.9194754	1013	0.3449276	0.3522008	2260	0.1496459	0.1528012	1032
16	-0.9159832	-0.9124223	-1058	-0.3594474	-0.3666668	+2247	-0.1559449	-0.1590767	+1028
17	0.9087927	0.9050946	1102	0.3738586	0.3810224	2234	0.1621965	0.1653042	1023
18	0.9013285	0.8974948	1146	0.3881574	0.3952626	2219	0.1683993	0.1714815	1018
19	0.8935937	0.8896254	1190	0.4023377	0.4093825	2204	0.1745506	0.1776065	1013
20	0.8855902	0.8814887	1234	0.4163964	0.4233787	2188	0.1806490	0.1836778	1008
21	-0.8773410	-0.8730874	-1278	-0.4303288	-0.4372458	+2171	-0.1866926	-0.1896931	+1002
22	0.8687884	0.8644244	1322	0.4441296	0.4509799	2154	0.1926792	0.1956508	996
23	0.8599955	0.8555020	1366	0.4577960	0.4645773	2136	0.1986075	0.2015492	990
24	0.8509443	0.8463231	1410	0.4713233	0.4780336	2117	0.2044756	0.2073864	983
25	0.8416385	0.8368906	1453	0.4847077	0.4913451	2098	0.2102816	0.2131610	976
26	-0.8320800	-0.8272073	-1496	-0.4979454	-0.5045078	+2079	-0.2160243	-0.2188712	+ 969
27	0.8222726	0.8172760	1539	0.5110321	0.5175180	2059	0.2217015	0.2245152	961
28	0.8122181	0.8070993	1581	0.5239647	0.5303718	2038	0.2273121	0.2300917	952
29	0.8019198	0.7966796	1623	0.5367390	0.5430661	2016	0.2328541	0.2355991	943
30	0.7913796	0.7860205	1665	0.5493523	0.5555968	1993	0.2383264	0.2410357	934
31	-0.7806021	-0.7751244	-1706	-0.5617995	-0.5679601	+1969	-0.2437269	-0.2463998	+ 924
Nov. 1	0.7695882	0.7639942	1747	0.5740781	0.5801528	1945	0.2490543	0.2516900	914
2	0.7583423	0.7526327	1788	0.5861839	0.5921710	1920	0.2543068	0.2569045	904
3	0.7468660	0.7410426	1829	0.5981135	0.6040106	1895	0.2594828	0.2620415	894
4	0.7351629	0.7292271	1869	0.6098623	0.6156682	1870	0.2645804	0.2670994	883
5	-0.7232357	-0.7171890	-1909	-0.6214277	-0.6271399	+1844	-0.2695983	-0.2720770	+ 872
6	0.7110875	0.7049314	1949	0.6328048	0.6384224	1817	0.2745347	0.2769720	860
7	0.6987215	0.6924584	1988	0.6439917	0.6495117	1789	0.2793883	0.2817832	848
8	0.6861422	0.6797730	2027	0.6549822	0.6604031	1760	0.2841566	0.2865086	836
9	0.6733516	0.6668787	2065	0.6657737	0.6710936	1731	0.2888385	0.2911465	823
10	-0.6603544	-0.6537790	-2103	-0.6763624	-0.6815796	+1701	-0.2934323	-0.2956956	+ 810
11	0.6471533	0.6404780	2141	0.6867447	0.6918571	1671	0.2979363	0.3001540	797
12	0.6337534	0.6269801	2178	0.6969165	0.7019227	1641	0.3023487	0.3045203	784
13	0.6201585	0.6132892	2215	0.7068750	0.7117730	1610	0.3066686	0.3087932	770
14	0.6063728	0.5994096	2252	0.7166162	0.7214041	1578	0.3108940	0.3129708	756
15	-0.5924003	-0.5853456	-2288	-0.7261364	-0.7308128	+1545	-0.3150235	-0.3170519	+ 742
16	-0.5782461	-0.5711025	-2324	-0.7354329	-0.7399965	+1512	-0.3190558	-0.3210352	+ 727

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Date.	X		Reduc. to Mean Eq'x of Jan. 0.	Y		Reduc. to Mean Eq'x of Jan. 0.	Z		Reduc. to Mean Eq'x of Jan. 0.
	True Equinox.			True Equinox.			True Equinox.		
	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.	Noon.	Midnight.	Noon.
Nov. 16	-0.5782461	-0.5711025	-2324	-0.7354329	-0.7399965	+1512	-0.3190558	-0.3210352	+727
17	0.5639151	0.5566844	2359	0.7445030	0.7489520	1478	0.3229899	0.3249195	712
18	0.5494111	0.5420957	2393	0.7533431	0.7576759	1443	0.3268241	0.3287035	697
19	0.5347389	0.5273414	2427	0.7619503	0.7661659	1407	0.3305575	0.3323860	681
20	0.5199037	0.5124266	2460	0.7703226	0.7744201	1371	0.3341890	0.3359663	665
21	-0.5049105	-0.4973558	-2492	-0.7784579	-0.7824353	+1334	-0.3377177	-0.3394430	+649
22	0.4897633	0.4821336	2524	0.7863522	0.7902087	1297	0.3411421	0.3428150	632
23	0.4744671	0.4667643	2555	0.7940044	0.7977388	1259	0.3444616	0.3460816	615
24	0.4590259	0.4512528	2586	0.8014120	0.8050241	1220	0.3476751	0.3492420	598
25	0.4434454	0.4356040	2616	0.8085743	0.8120619	1181	0.3507822	0.3522953	581
26	-0.4277296	-0.4198225	-2645	-0.8154870	-0.8188494	+1141	-0.3537814	-0.3552403	+563
27	0.4118834	0.4039127	2674	0.8221489	0.8253854	1101	0.3566719	0.3580763	545
28	0.3959111	0.3878792	2702	0.8285587	0.8316686	1061	0.3594532	0.3608025	527
29	0.3798175	0.3717266	2729	0.8347146	0.8376964	1020	0.3621242	0.3634181	509
30	0.3636070	0.3554592	2756	0.8406139	0.8434666	978	0.3646840	0.3659219	490
Dec. 1	-0.3472838	-0.3390817	-2782	-0.8462546	-0.8489777	+ 936	-0.3671317	-0.3683133	+471
2	0.3308532	0.3225989	2808	0.8516356	0.8542280	893	0.3694667	0.3705917	452
3	0.3143194	0.3060152	2833	0.8567548	0.8592156	850	0.3716881	0.3727559	433
4	0.2976870	0.2893356	2857	0.8616103	0.8639385	806	0.3737949	0.3748051	414
5	0.2809615	0.2725655	2881	0.8662000	0.8683944	762	0.3757864	0.3767385	394
6	-0.2641480	-0.2557094	-2904	-0.8705217	-0.8725819	+ 718	-0.3776614	-0.3785552	+374
7	0.2472505	0.2387720	2926	0.8745747	0.8764997	673	0.3794198	0.3802549	354
8	0.2302747	0.2217593	2947	0.8783566	0.8801452	628	0.3810604	0.3818362	334
9	0.2132262	0.2046760	2967	0.8818655	0.8835173	582	0.3825824	0.3832988	313
10	0.1961095	0.1875278	2986	0.8851004	0.8866149	535	0.3839854	0.3846421	292
11	-0.1789314	-0.1703208	-3004	-0.8880604	-0.8894364	+ 488	-0.3852689	-0.3858655	+271
12	0.1616968	0.1530602	3021	0.8907431	0.8919806	440	0.3864321	0.3869685	250
13	0.1444116	0.1357515	3037	0.8931485	0.8942466	392	0.3874749	0.3879509	228
14	0.1270809	0.1184005	3052	0.8952750	0.8962335	344	0.3883967	0.3888121	206
15	0.1097110	0.1010134	3066	0.8971220	0.8979406	295	0.3891972	0.3895520	184
16	-0.0923081	-0.0835955	-3080	-0.8986891	-0.8993672	+ 246	-0.3898763	-0.3901701	+162
17	0.0748766	0.0661525	3093	0.8999751	0.9005129	196	0.3904335	0.3906666	140
18	0.0574237	0.0486907	3106	0.9009806	0.9013782	146	0.3908694	0.3910417	118
19	0.0399543	0.0312152	3118	0.9017057	0.9019629	96	0.3911835	0.3912949	96
20	0.0224741	-0.0137316	3129	0.9021498	0.9022665	+ 46	0.3913759	0.3914264	74
21	-0.0049883	+0.0037551	-3139	-0.9023131	-0.9022896	- 5	-0.3914465	-0.3914363	+ 52
22	+0.0124977	0.0212387	3147	0.9021960	0.9020321	56	0.3913958	0.3913248	29
23	0.0299777	0.0387142	3154	0.9017982	0.9014948	107	0.3912234	0.3910919	+ 6
24	0.0474475	0.0561765	3161	0.9011216	0.9006783	159	0.3909302	0.3907381	- 17
25	0.0649009	0.0736203	3167	0.9001652	0.8995823	211	0.3905157	0.3902631	40
26	+0.0823338	+0.0910405	-3173	-0.8989297	-0.8982078	- 263	-0.3899804	-0.3896675	- 63
27	0.0997400	0.1084320	3178	0.8974163	0.8965552	316	0.3893245	0.3889513	86
28	0.1171156	0.1257900	3182	0.8956246	0.8946249	370	0.3885479	0.3881145	110
29	0.1344548	0.1431095	3185	0.8935560	0.8924179	424	0.3876511	0.3871576	134
30	0.1517533	0.1603854	3187	0.8912106	0.8899343	479	0.3866342	0.3860808	158
31	+0.1690053	+0.1776123	-3187	-0.8885890	-0.8871746	- 534	-0.3854974	-0.3848841	-182
32	+0.1862058	+0.1947851	-3186	-0.8856914	-0.8841394	- 590	-0.3842408	-0.3835677	-206

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	JANUARY.		Day of Month.	FEBRUARY.		Day of Month.	MARCH.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	30 12 2.5	+5 15 34.3	1.0	74 13 20.5	+3 34 31.5	1.0	82 8 0.6	+2 52 36.2
1.5	36 13 30.7	5 11 57.8	1.5	80 7 59.1	3 9 22.4	1.5	88 2 42.7	2 25 5.9
2.0	42 12 41.6	5 4 58.4	2.0	86 3 20.0	2 42 8.7	2.0	93 58 15.6	1 55 58.4
2.5	48 10 5.5	4 54 43.2	2.5	91 59 52.6	2 13 4.7	2.5	99 55 17.4	1 25 29.0
3.0	54 6 11.0	4 41 20.1	3.0	97 58 3.7	1 42 26.3	3.0	105 54 24.7	0 53 53.9
3.5	60 1 25.0	+4 24 58.1	3.5	103 58 17.9	+1 10 30.4	3.5	111 56 11.9	+0 21 30.2
4.0	65 56 12.7	4 5 47.1	4.0	110 0 56.9	0 37 35.1	4.0	118 1 10.3	-0 11 23.4
4.5	71 50 56.9	3 43 58.3	4.5	116 6 19.5	+0 4 0.5	4.5	124 9 48.1	0 44 26.6
5.0	77 45 59.1	3 19 43.5	5.0	122 14 41.5	-0 29 51.9	5.0	130 22 29.6	1 17 17.4
5.5	83 41 38.4	2 53 16.3	5.5	128 26 15.6	1 3 39.3	5.5	136 39 34.6	1 49 32.4
6.0	89 38 12.3	+2 24 51.6	6.0	134 41 11.5	-1 36 57.6	6.0	143 1 17.8	-2 20 46.9
6.5	95 35 56.8	1 54 45.5	6.5	140 59 36.1	2 9 21.6	6.5	149 27 48.3	2 50 34.8
7.0	101 35 6.5	1 23 15.3	7.0	147 21 33.2	2 40 25.7	7.0	155 59 9.3	3 18 28.8
7.5	107 35 55.2	0 50 40.0	7.5	153 47 4.0	3 9 43.9	7.5	162 35 18.1	3 44 2.0
8.0	113 38 35.6	+0 17 19.9	8.0	160 16 7.6	3 36 50.3	8.0	169 16 5.9	4 6 47.6
8.5	119 43 19.7	-0 16 24.0	8.5	166 48 40.6	-4 1 19.9	8.5	176 1 18.3	-4 26 20.1
9.0	125 50 19.4	0 50 9.8	9.0	173 24 38.4	4 22 49.0	9.0	182 50 35.3	4 42 16.0
9.5	131 59 46.5	1 23 34.4	9.5	180 3 54.9	4 40 55.5	9.5	189 43 33.2	4 54 14.8
10.0	138 11 52.9	1 56 14.5	10.0	186 46 23.3	4 55 19.7	10.0	196 39 43.7	5 1 59.6
10.5	144 26 50.9	2 27 46.4	10.5	193 31 56.0	5 5 44.6	10.5	203 38 37.1	5 5 17.9
11.0	150 44 53.0	-2 57 46.1	11.0	200 20 25.5	-5 11 56.2	11.0	210 39 42.6	-5 4 2.1
11.5	157 6 12.4	3 25 50.0	11.5	207 11 44.0	5 13 44.1	11.5	217 42 29.5	4 58 9.7
12.0	163 31 2.6	3 51 34.6	12.0	214 5 43.7	5 11 1.4	12.0	224 46 28.3	4 47 43.7
12.5	169 59 37.2	4 14 36.9	12.5	221 2 16.8	5 3 45.8	12.5	231 51 12.3	4 32 52.3
13.0	176 32 9.7	4 34 35.0	13.0	228 1 15.6	4 51 58.6	13.0	238 56 17.8	4 13 48.8
13.5	183 8 53.4	-4 51 7.9	13.5	235 2 31.5	-4 35 46.1	13.5	246 1 24.5	-3 50 51.0
14.0	189 50 0.2	5 3 56.1	14.0	242 5 55.5	4 15 18.8	14.0	253 6 15.7	3 24 21.0
14.5	196 35 40.0	5 12 41.8	14.5	249 11 16.8	3 50 51.9	14.5	260 10 38.0	2 54 44.0
15.0	203 26 0.6	5 17 9.4	15.0	256 18 22.8	3 22 45.5	15.0	267 14 21.0	2 22 28.9
15.5	210 21 6.2	5 17 6.0	15.5	263 26 58.9	2 51 24.0	15.5	274 17 16.8	1 48 6.9
16.0	217 20 56.7	-5 12 22.5	16.0	270 36 47.4	-2 17 16.3	16.0	281 19 18.7	-1 12 10.7
16.5	224 25 26.6	5 2 53.4	16.5	277 47 27.3	1 40 55.3	16.5	288 20 20.8	-0 35 14.6
17.0	231 34 24.8	4 48 38.2	17.0	284 58 34.2	1 2 57.1	17.0	295 20 16.7	+0 2 6.4
17.5	238 47 33.1	4 29 41.9	17.5	292 9 40.0	-0 24 0.4	17.5	302 18 59.1	0 39 17.1
18.0	246 4 26.5	4 6 16.0	18.0	299 20 13.8	+0 15 14.6	18.0	309 16 19.0	1 15 43.1
18.5	253 24 32.4	-3 38 38.1	18.5	306 29 42.2	+0 54 7.0	18.5	316 12 5.6	+1 50 51.1
19.0	260 47 11.3	3 7 12.8	19.0	313 37 29.5	1 31 57.0	19.0	323 6 5.7	2 24 9.8
19.5	268 11 37.4	2 32 31.4	19.5	320 42 59.2	2 8 6.7	19.5	329 58 3.9	2 55 10.6
20.0	275 36 59.4	1 55 10.9	20.0	327 45 35.6	2 42 1.5	20.0	336 47 43.0	3 23 25.7
20.5	283 2 22.1	1 15 53.1	20.5	334 44 44.4	3 13 10.8	20.5	343 34 44.7	3 48 34.6
21.0	290 26 48.4	-0 35 23.3	21.0	341 39 54.3	+3 41 8.9	21.0	350 18 50.0	+4 10 18.6
21.5	297 49 21.0	+0 5 31.5	21.5	348 30 38.1	4 5 35.4	21.5	356 59 40.4	4 28 23.4
22.0	305 9 4.8	0 46 4.9	22.0	355 16 33.6	4 26 15.3	22.0	3 36 58.7	4 42 39.2
22.5	312 25 8.5	1 25 32.3	22.5	1 57 24.6	4 42 59.0	22.5	10 10 30.2	4 53 0.7
23.0	319 36 45.8	2 3 12.8	23.0	8 33 1.4	4 55 41.7	23.0	16 40 3.1	4 59 26.5
23.5	326 43 17.9	+2 38 30.4	23.5	15 3 20.9	+5 4 22.7	23.5	23 5 29.8	+5 1 58.8
24.0	333 44 14.1	3 10 54.8	24.0	21 28 26.4	5 9 5.2	24.0	29 26 47.0	5 0 43.2
24.5	340 39 11.9	3 40 1.9	24.5	27 48 27.8	5 9 55.4	24.5	35 43 56.1	4 55 48.0
25.0	347 27 57.6	4 5 33.5	25.0	34 3 41.0	5 7 1.7	25.0	41 57 4.0	4 47 23.6
25.5	354 10 26.2	4 27 17.2	25.5	40 14 27.0	5 0 34.3	25.5	48 6 22.4	4 35 42.0
26.0	0 46 40.3	+4 45 5.5	26.0	46 21 11.3	+4 50 44.6	26.0	54 12 8.0	+4 20 56.6
26.5	7 16 50.3	4 58 55.6	26.5	52 24 23.8	4 37 44.4	26.5	60 14 42.2	4 3 21.6
27.0	13 41 13.0	5 8 48.1	27.0	58 24 37.6	4 21 46.4	27.0	66 14 30.5	3 43 11.5
27.5	20 0 10.3	5 14 46.4	27.5	64 22 28.2	4 3 3.6	27.5	72 12 2.4	3 20 41.2
28.0	26 14 8.9	5 16 56.1	28.0	70 18 33.0	3 41 48.7	28.0	78 7 50.9	2 56 5.7
28.5	32 23 39.1	+5 15 24.6	28.5	76 13 30.6	+3 18 15.0	28.5	84 2 31.7	+2 29 40.1
29.0	38 29 13.6	5 10 20.1	29.0	82 8 0.6	2 52 36.2	29.0	89 56 42.8	2 1 39.4
29.5	44 31 27.2	5 1 51.7	29.5	88 2 42.7	2 25 5.9	29.5	95 51 4.1	1 32 18.9
30.0	50 30 55.7	4 50 9.5	30.0	93 58 15.6	1 55 58.4	30.0	101 46 16.4	1 1 54.0
30.5	56 28 15.3	4 35 23.3	30.5	99 55 17.4	1 25 29.0	30.5	107 43 1.3	+0 30 40.9
31.0	62 24 2.5	+4 17 44.1	31.0	105 54 24.7	+0 53 53.9	31.0	113 42 0.2	-0 1 3.6
31.5	68 18 52.6	+3 57 23.0	31.5	111 56 11.9	+0 21 30.2	31.5	119 43 54.1	-0 33 1.9



## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	APRIL.		Day of Month.	MAY.		Day of Month.	JUNE.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	125 49 21.9	-1 4 55.2	1.0	158 55 33.9	-3 47 52.6	1.0	208 3 35.4	-5 6 43.7
1.5	131 59 0.6	1 36 23.4	1.5	165 27 24.0	4 9 15.2	1.5	215 15 34.7	4 57 42.8
2.0	138 13 23.8	2 7 4.6	2.0	172 6 0.5	4 27 38.4	2.0	222 33 48.0	4 43 45.5
2.5	144 33 0.9	2 36 35.8	2.5	178 51 35.1	4 42 37.4	2.5	229 57 32.7	4 24 54.7
3.0	150 58 15.6	3 4 32.4	3.0	185 44 9.9	4 53 47.9	3.0	237 25 55.3	4 1 21.3
3.5	157 29 25.8	-3 30 28.6	3.5	192 43 36.3	-5 0 47.7	3.5	244 57 53.2	-3 33 24.8
4.0	164 6 41.4	3 53 57.7	4.0	199 49 34.8	5 3 17.5	4.0	252 32 17.1	3 1 32.9
4.5	170 50 4.6	4 14 32.8	4.5	207 1 34.2	5 1 2.7	4.5	260 7 53.0	2 26 21.3
5.0	177 39 28.4	4 31 47.8	5.0	214 18 52.3	4 53 54.3	5.0	267 43 26.5	1 48 31.9
5.5	184 34 36.1	4 45 17.9	5.5	221 40 37.2	4 41 49.9	5.5	275 17 44.9	1 8 51.4
6.0	191 35 3.1	-4 54 41.2	6.0	229 5 49.1	-4 24 54.9	6.0	282 49 40.6	-0 28 8.7
6.5	198 40 15.0	4 59 39.5	6.5	236 33 22.6	4 3 22.9	6.5	290 18 12.5	+0 12 46.9
7.0	205 49 30.4	4 59 59.4	7.0	244 2 9.0	3 37 35.2	7.0	297 42 29.2	0 53 8.0
7.5	213 2 2.2	4 55 33.4	7.5	251 31 1.1	3 8 0.7	7.5	305 1 48.6	1 32 10.7
8.0	220 16 59.3	4 46 20.8	8.0	258 58 53.8	2 35 13.7	8.0	312 15 39.3	2 9 16.0
8.5	227 33 29.0	-4 32 27.3	8.5	266 24 48.5	-1 59 54.2	8.5	319 23 39.8	+2 43 50.0
9.0	234 50 39.1	4 14 5.7	9.0	273 47 53.6	1 22 44.2	9.0	326 25 38.0	3 15 25.3
9.5	242 7 40.3	3 51 35.0	9.5	281 7 26.6	0 44 27.0	9.5	333 21 30.2	3 43 40.1
10.0	249 23 47.9	3 25 19.9	10.0	288 22 54.3	-0 5 45.3	10.0	340 11 20.5	4 8 18.0
10.5	256 38 23.2	2 55 49.5	10.5	295 33 52.8	+0 32 40.0	10.5	346 55 18.1	4 29 7.6
11.0	263 50 54.6	-2 23 36.7	11.0	302 40 7.3	+1 10 10.5	11.0	353 33 37.2	+4 46 1.8
11.5	271 0 57.1	1 49 16.7	11.5	309 41 30.5	1 46 12.4	11.5	0 6 35.7	4 58 57.1
12.0	278 8 13.0	1 13 25.7	12.0	316 38 1.5	2 20 14.7	12.0	6 34 33.9	5 7 53.4
12.5	285 12 31.1	-0 36 40.3	12.5	323 29 44.9	2 51 51.2	12.5	12 57 53.1	5 12 53.1
13.0	292 13 45.3	+0 0 23.4	13.0	330 16 49.3	3 20 39.8	13.0	19 16 56.2	5 14 0.8
13.5	299 11 54.0	+0 37 10.5	13.5	336 59 25.9	+3 46 22.2	13.5	25 32 5.6	+5 11 22.9
14.0	306 6 58.6	1 13 8.1	14.0	343 37 47.6	4 8 43.7	14.0	31 43 43.6	5 5 7.6
14.5	312 59 2.7	1 47 45.2	14.5	350 12 8.0	4 27 33.0	14.5	37 52 11.8	4 55 24.3
15.0	319 48 10.6	2 20 33.4	15.0	356 42 40.8	4 42 42.1	15.0	43 57 50.9	4 42 23.8
15.5	326 34 26.7	2 51 6.9	15.5	3 9 39.0	4 54 6.2	15.5	50 1 0.7	4 26 18.0
16.0	333 17 54.6	+3 19 2.8	16.0	9 33 15.0	+5 1 42.6	16.0	56 1 59.8	+4 7 20.0
16.5	339 58 36.7	3 44 1.3	16.5	15 53 39.9	5 5 31.7	16.5	62 1 5.8	3 45 43.9
17.0	346 36 33.8	4 5 45.6	17.0	22 11 3.9	5 5 36.2	17.0	67 58 35.7	3 21 44.8
17.5	353 11 45.1	4 24 2.2	17.5	28 25 36.1	5 2 0.9	17.5	73 54 46.0	2 55 38.6
18.0	359 44 8.0	4 38 41.1	18.0	34 37 24.7	4 54 52.8	18.0	79 49 52.6	2 27 41.9
18.5	6 13 39.0	+4 49 35.4	18.5	40 46 37.7	+4 44 21.1	18.5	85 44 11.3	+1 58 12.3
19.0	12 40 13.9	4 56 41.6	19.0	46 53 22.6	4 30 36.4	19.0	91 37 58.0	1 27 27.8
19.5	19 3 48.1	4 59 59.5	19.5	52 57 47.6	4 13 51.3	19.5	97 31 29.4	0 55 47.0
20.0	25 24 17.8	4 59 31.9	20.0	59 0 1.4	3 54 19.4	20.0	103 25 2.6	+0 23 28.9
20.5	31 41 40.5	4 55 24.5	20.5	65 0 13.9	3 32 15.9	20.5	109 18 55.6	-0 9 7.5
21.0	37 55 55.2	+4 47 45.5	21.0	70 58 36.4	+3 7 56.6	21.0	115 13 27.9	-0 41 42.8
21.5	44 7 3.5	4 36 45.3	21.5	76 55 22.1	2 41 38.5	21.5	121 8 59.9	1 13 57.5
22.0	50 15 9.8	4 22 36.0	22.0	82 50 46.3	2 13 38.6	22.0	127 5 53.4	1 45 32.2
22.5	56 20 21.9	4 5 31.4	22.5	88 45 6.4	1 44 14.9	22.5	133 4 32.2	2 16 7.5
23.0	62 22 51.0	3 45 46.4	23.0	94 38 42.3	1 13 45.1	23.0	139 5 21.3	2 45 23.9
23.5	68 22 52.1	+3 23 36.5	23.5	100 31 56.7	+0 42 27.3	23.5	145 8 46.8	-3 13 2.1
24.0	74 20 43.8	2 59 17.9	24.0	106 25 14.7	+0 10 39.7	24.0	151 15 16.2	3 38 42.8
24.5	80 16 48.4	2 33 7.0	24.5	112 19 3.8	-0 21 19.7	24.5	157 25 18.3	4 2 6.8
25.0	86 11 31.6	2 5 20.5	25.0	118 13 53.9	0 53 12.7	25.0	163 39 22.0	4 22 54.9
25.5	92 5 22.8	1 36 15.0	25.5	124 10 17.4	1 24 40.9	25.5	169 57 56.1	4 40 48.2
26.0	97 58 54.0	+1 6 7.1	26.0	130 8 48.4	-1 55 25.9	26.0	176 21 28.7	-4 55 27.7
26.5	103 52 40.2	0 35 13.5	26.5	136 10 2.6	2 25 8.8	26.5	182 50 26.6	5 6 35.2
27.0	109 47 18.6	+0 3 51.2	27.0	142 14 36.5	2 53 30.5	27.0	189 25 13.6	5 13 53.1
27.5	115 43 28.3	-0 27 43.0	27.5	148 23 7.5	3 20 11.2	27.5	196 6 10.3	5 17 5.2
28.0	121 41 49.5	0 59 11.3	28.0	154 36 12.4	3 44 50.6	28.0	202 53 32.1	5 15 57.0
28.5	127 43 3.4	-1 30 15.4	28.5	160 54 27.0	-4 7 7.6	28.5	209 47 28.8	-5 10 16.7
29.0	133 47 51.2	2 0 36.4	29.0	167 18 24.7	4 26 40.7	29.0	216 48 2.2	4 59 55.8
29.5	139 56 53.1	2 29 54.4	29.5	173 48 35.8	4 43 8.0	29.5	223 55 6.0	4 44 50.8
30.0	146 10 47.5	2 57 48.2	30.0	180 25 25.7	4 56 7.6	30.0	231 8 24.3	4 25 3.3
30.5	152 30 10.5	3 23 55.4	30.5	187 9 13.6	5 5 18.0	30.5	238 27 30.5	4 0 41.9
31.0	158 55 33.9	-3 47 52.6	31.0	194 0 11.3	-5 10 18.9	31.0	245 51 47.9	-3 32 2.6
31.5	165 27 24.0	-4 9 15.2	31.5	200 58 21.2	-5 10 52.4	31.5	253 20 30.2	-2 59 29.0

FOR GREENWICH MEAN NOON AND MIDNIGHT.								
Day of Month.	JULY.		Day of Month.	AUGUST.		Day of Month.	SEPTEMBER.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	245 51 47.9	-3 32 2.6	1.0	299 35 0.7	+1 5 19.6	1.0	351 52 13.5	+4 38 49.3
1.5	253 20 30.2	2 59 29.0	1.5	307 4 15.8	1 45 3.5	1.5	358 53 37.4	4 52 13.8
2.0	260 52 41.4	2 23 32.7	2.0	314 31 33.0	2 22 47.1	2.0	5 49 37.0	5 1 7.8
2.5	268 27 18.0	1 44 52.8	2.5	321 55 50.9	2 57 49.1	2.5	12 39 48.1	5 5 34.0
3.0	276 3 11.5	1 4 14.1	3.0	329 16 12.6	3 29 33.7	3.0	19 23 55.6	5 5 39.8
3.5	283 39 10.1	-0 22 25.6	3.5	336 31 47.6	+3 57 32.2	3.5	26 1 53.1	+5 1 37.0
4.0	291 14 1.7	+0 19 41.1	4.0	343 41 53.5	4 21 23.2	4.0	32 33 42.7	4 53 40.1
4.5	298 46 36.9	1 1 14.8	4.5	350 45 56.9	4 40 52.4	4.5	38 59 34.4	4 42 5.6
5.0	306 15 51.2	1 41 26.5	5.0	357 43 34.7	4 55 52.5	5.0	45 19 45.5	4 27 11.5
5.5	313 40 47.2	2 19 31.8	5.5	4 34 33.1	5 6 22.5	5.5	51 34 39.4	4 9 16.6
6.0	321 0 36.2	+2 54 51.8	6.0	11 18 48.0	+5 12 26.2	6.0	57 44 44.7	+3 48 39.5
6.5	328 14 39.1	3 26 54.5	6.5	17 56 24.1	5 14 11.8	6.5	63 50 34.1	3 25 38.8
7.0	335 22 27.3	3 55 15.0	7.0	24 27 34.0	5 11 50.4	7.0	69 52 43.7	3 0 32.9
7.5	342 23 42.4	4 19 35.2	7.5	30 52 37.1	5 5 35.4	7.5	75 51 51.7	2 33 39.7
8.0	349 18 15.5	4 39 44.1	8.0	37 11 57.9	4 55 41.7	8.0	81 48 37.8	2 5 16.4
8.5	356 6 6.9	+4 55 35.8	8.5	43 26 5.8	+4 42 25.1	8.5	87 43 42.6	+1 35 40.2
9.0	2 47 24.3	5 7 9.3	9.0	49 35 33.2	4 26 1.6	9.0	93 37 46.8	1 5 7.9
9.5	9 22 22.0	5 14 28.1	9.5	55 40 54.8	4 6 47.9	9.5	99 31 30.3	0 33 56.5
10.0	15 51 19.7	5 17 38.3	10.0	61 42 46.9	3 45 0.3	10.0	105 25 32.2	+0 2 22.8
10.5	22 14 41.3	5 16 48.7	10.5	67 41 46.3	3 20 55.0	10.5	111 20 29.8	-0 29 15.7
11.0	28 32 53.7	+5 12 9.7	11.0	73 38 29.8	+2 54 48.4	11.0	117 16 58.1	-1 0 41.2
11.5	34 46 25.8	5 3 52.8	11.5	79 33 33.7	2 26 56.8	11.5	123 15 29.9	1 31 35.4
12.0	40 55 47.9	4 52 10.7	12.0	85 27 33.0	1 57 36.6	12.0	129 16 34.4	2 1 38.9
12.5	47 1 30.7	4 37 16.8	12.5	91 21 1.5	1 27 4.6	12.5	135 20 37.7	2 30 32.1
13.0	53 4 4.8	4 19 25.0	13.0	97 14 31.1	0 55 38.0	13.0	141 28 1.6	2 57 54.5
13.5	59 4 0.5	+3 58 49.7	13.5	103 8 31.4	+0 23 34.3	13.5	147 39 3.5	-3 23 25.2
14.0	65 1 46.7	3 35 45.7	14.0	109 3 29.8	-0 8 48.2	14.0	153 53 56.6	3 46 43.4
14.5	70 57 51.4	3 10 28.4	14.5	114 59 51.2	0 41 10.5	14.5	160 12 49.3	4 7 28.1
15.0	76 52 41.0	2 43 13.7	15.0	120 57 57.9	1 13 13.2	15.0	166 35 45.1	4 25 19.0
15.5	82 46 40.4	2 14 18.2	15.5	126 58 9.4	1 44 36.1	15.5	173 2 43.1	4 39 57.2
16.0	88 40 13.2	+1 43 58.9	16.0	133 0 42.7	-2 14 58.6	16.0	179 33 37.8	-4 51 5.3
16.5	94 33 41.1	1 12 33.6	16.5	139 5 51.9	2 43 59.7	16.5	186 8 20.1	4 58 28.1
17.0	100 27 24.6	0 40 20.4	17.0	145 13 48.6	3 11 18.4	17.0	192 46 37.6	5 1 53.3
17.5	106 21 42.7	+0 7 38.5	17.5	151 24 42.2	3 36 33.6	17.5	199 28 15.3	5 1 12.2
18.0	112 16 53.5	-0 25 12.7	18.0	157 38 39.9	3 59 25.1	18.0	206 12 56.8	4 56 19.2
18.5	118 13 14.0	-0 57 53.3	18.5	163 55 46.7	-4 19 33.1	18.5	213 0 25.1	-4 47 13.5
19.0	124 11 0.2	1 30 3.0	19.0	170 16 6.1	4 36 39.2	19.0	219 50 23.1	4 33 58.2
19.5	130 10 27.7	2 1 21.3	19.5	176 39 40.7	4 50 26.3	19.5	226 42 35.1	4 16 40.8
20.0	136 11 51.8	2 31 28.0	20.0	183 6 32.3	5 0 39.3	20.0	233 36 46.5	3 55 33.1
20.5	142 15 27.6	3 0 2.2	20.5	189 36 42.0	5 7 5.3	20.5	240 32 45.1	3 30 50.9
21.0	148 21 30.2	-3 26 44.3	21.0	196 10 10.8	-5 9 33.7	21.0	247 30 20.7	-3 2 54.2
21.5	154 30 15.2	3 51 14.5	21.5	202 46 59.8	5 7 56.7	21.5	254 29 25.0	2 32 6.4
22.0	160 41 58.2	4 13 13.6	22.0	209 27 10.5	5 2 9.7	22.0	261 29 51.5	1 58 54.1
22.5	166 56 55.4	4 32 23.2	22.5	216 10 44.7	4 52 11.0	22.5	268 31 34.8	1 23 46.8
23.0	173 15 23.2	4 48 26.0	23.0	222 57 44.2	4 38 2.4	23.0	275 34 30.1	0 47 16.6
23.5	179 37 38.6	-5 1 5.6	23.5	229 48 10.7	-4 19 49.7	23.5	282 38 31.5	-0 9 57.4
24.0	186 3 58.2	5 10 6.8	24.0	236 42 5.5	3 57 42.4	24.0	289 43 32.9	+0 27 35.5
24.5	192 34 38.4	5 15 16.1	24.5	243 39 28.7	3 31 53.9	24.5	296 49 24.4	1 4 45.8
25.0	199 9 54.8	5 16 21.7	25.0	250 40 18.5	3 2 42.1	25.0	303 55 53.5	1 40 57.2
25.5	205 50 1.7	5 13 14.0	25.5	257 44 30.8	2 30 29.3	25.5	311 2 44.1	2 15 33.9
26.0	212 35 11.2	-5 5 46.1	26.0	264 51 57.9	-1 55 42.1	26.0	318 9 35.6	+2 48 1.6
26.5	219 25 32.7	4 53 54.1	26.5	272 2 27.7	1 18 51.5	26.5	325 16 3.4	3 17 48.2
27.0	226 21 11.7	4 37 37.8	27.0	279 15 42.9	0 40 32.3	27.0	332 21 38.8	3 44 25.2
27.5	233 22 8.3	4 17 1.8	27.5	286 31 20.8	-0 1 22.8	27.5	339 25 49.8	4 7 27.7
28.0	240 28 17.4	3 52 15.1	28.0	293 48 52.4	+0 37 56.2	28.0	346 28 2.1	4 26 35.7
28.5	247 39 27.8	-3 23 32.9	28.5	301 7 42.7	+1 16 42.5	28.5	353 27 40.8	+4 41 34.4
29.0	254 55 20.6	2 51 16.2	29.0	308 27 10.8	1 54 13.5	29.0	0 24 11.1	4 52 14.7
29.5	262 15 28.4	2 15 52.5	29.5	315 46 31.1	2 29 47.8	29.5	7 17 0.0	4 58 32.8
30.0	269 39 15.9	1 37 55.4	30.0	323 4 55.0	3 2 47.0	30.0	14 5 38.5	5 0 30.2
30.5	277 6 0.1	0 58 4.1	30.5	330 21 30.8	3 32 36.8	30.5	20 49 42.1	4 58 13.5
31.0	284 34 50.7	-0 17 2.7	31.0	337 35 27.9	+3 58 47.9	31.0	27 28 52.1	+4 51 53.4
31.5	292 4 51.2	+0 24 21.4	31.5	344 45 57.2	+4 20 57.4	31.5	34 2 56.0	+4 41 43.9

## FOR GREENWICH MEAN NOON AND MIDNIGHT.

Day of Month.	OCTOBER.		Day of Month.	NOVEMBER.		Day of Month.	DECEMBER.	
	True Longitude.	Latitude.		True Longitude.	Latitude.		True Longitude.	Latitude.
1.0	27 28 52.1	+4 51 53.4	1.0	73 34 48.2	+2 17 33.4	1.0	105 41 29.2	-0 38 8.7
1.5	34 2 56.0	4 41 43.9	1.5	79 38 14.7	1 47 57.5	1.5	111 35 22.9	1 10 6.2
2.0	40 31 48.6	4 28 1.9	2.0	85 38 45.8	1 17 20.7	2.0	117 28 44.6	1 41 17.3
2.5	46 55 31.6	4 11 6.1	2.5	91 36 47.6	0 46 2.8	2.5	123 22 2.9	2 11 24.4
3.0	53 14 13.2	3 51 16.3	3.0	97 32 49.5	+0 14 22.8	3.0	129 15 48.8	2 40 10.7
3.5	59 28 8.3	+3 28 52.9	3.5	103 27 24.0	-0 17 20.8	3.5	135 10 35.3	-3 7 19.9
4.0	65 37 37.6	3 4 16.4	4.0	109 21 6.4	0 48 50.2	4.0	141 6 57.1	3 32 35.6
4.5	71 43 6.7	2 37 47.0	4.5	115 14 34.1	1 19 48.2	4.5	147 5 30.1	3 55 42.1
5.0	77 45 6.0	2 9 44.3	5.0	121 8 26.5	1 49 58.1	5.0	153 6 51.2	4 16 24.0
5.5	83 44 9.5	1 40 27.3	5.5	127 3 23.7	2 19 3.1	5.5	159 11 37.8	4 34 25.3
6.0	89 40 53.9	+1 10 14.4	6.0	133 0 6.7	-2 46 46.6	6.0	165 20 26.6	-4 49 30.3
6.5	95 35 58.6	0 39 23.2	6.5	138 59 16.5	3 12 51.8	6.5	171 33 53.6	5 1 23.6
7.0	101 30 4.5	+0 8 11.0	7.0	145 1 33.4	3 37 1.4	7.0	177 52 32.4	5 9 49.7
7.5	107 23 53.1	-0 23 5.1	7.5	151 7 36.2	3 58 57.8	7.5	184 16 54.1	5 14 33.8
8.0	113 18 6.5	0 54 8.2	8.0	157 18 1.3	4 18 23.2	8.0	190 47 25.4	5 15 21.8
8.5	119 13 26.6	-1 24 41.6	8.5	163 33 22.1	-4 34 59.3	8.5	197 24 27.9	-5 12 1.3
9.0	125 10 33.9	1 54 27.7	9.0	169 54 7.7	4 48 27.6	9.0	204 8 16.6	5 4 22.0
9.5	131 10 7.6	2 23 9.0	9.5	176 20 41.7	4 58 29.9	9.5	210 58 58.7	4 52 16.9
10.0	137 12 44.6	2 50 27.0	10.0	182 53 21.7	5 4 49.0	10.0	217 56 32.3	4 35 43.0
10.5	143 18 58.5	3 16 2.9	10.5	189 32 17.8	5 7 9.0	10.5	225 0 45.9	4 14 42.6
11.0	149 29 19.3	-3 39 37.0	11.0	196 17 31.7	-5 5 16.2	11.0	232 11 17.7	-3 49 24.1
11.5	155 44 12.3	4 0 49.4	11.5	203 8 56.1	4 59 0.1	11.5	239 27 35.3	3 20 3.2
12.0	162 3 57.5	4 19 20.0	12.0	210 6 14.9	4 48 14.7	12.0	246 48 56.2	2 47 2.8
12.5	168 28 48.8	4 34 48.7	12.5	217 9 2.7	4 32 59.0	12.5	254 14 28.8	2 10 53.2
13.0	174 58 53.6	4 46 56.2	13.0	224 16 45.4	4 13 18.0	13.0	261 43 14.4	1 32 11.8
13.5	181 34 12.3	-4 55 24.6	13.5	231 28 41.6	-3 49 23.5	13.5	269 14 8.8	-0 51 42.0
14.0	188 14 38.1	4 59 58.2	14.0	238 44 4.1	3 21 34.0	14.0	276 46 4.7	-0 10 11.1
14.5	194 59 57.4	5 0 24.0	14.5	246 2 1.3	2 50 14.7	14.5	284 17 54.9	+0 31 31.3
15.0	201 49 50.0	4 56 32.9	15.0	253 21 39.8	2 15 57.2	15.0	291 48 33.5	1 12 35.1
15.5	208 43 49.6	4 48 20.3	15.5	260 42 6.2	1 39 17.9	15.5	299 16 59.9	1 52 12.6
16.0	215 41 25.4	-4 35 46.4	16.0	268 2 29.5	-1 0 57.2	16.0	306 42 19.5	+2 29 39.8
16.5	222 42 3.5	4 18 57.1	16.5	275 22 2.5	-0 21 37.7	16.5	314 3 45.5	3 4 18.0
17.0	229 45 8.2	3 58 3.9	17.0	282 40 3.2	+0 17 57.3	17.0	321 20 40.0	3 35 34.6
17.5	236 50 3.3	3 33 23.6	17.5	289 55 55.7	0 57 5.1	17.5	328 32 33.9	4 3 4.0
18.0	243 56 13.9	3 5 18.5	18.0	297 9 10.8	1 35 5.3	18.0	335 39 7.0	4 26 27.0
18.5	251 3 7.9	-2 34 15.0	18.5	304 19 25.9	+2 11 20.3	18.5	342 40 7.6	+4 45 30.9
19.0	258 10 16.6	2 0 43.5	19.0	311 26 24.5	2 45 16.5	19.0	349 35 31.3	5 0 8.7
19.5	265 17 15.6	1 25 17.5	19.5	318 29 55.2	3 16 24.7	19.5	356 25 20.4	5 10 18.3
20.0	272 23 44.8	0 48 32.1	20.0	325 29 51.8	3 44 19.8	20.0	3 9 42.2	5 16 1.9
20.5	279 29 28.4	-0 11 3.6	20.5	332 26 11.5	4 8 41.8	20.5	9 48 48.3	5 17 25.5
21.0	286 34 14.5	+0 26 31.4	21.0	339 18 54.4	+4 29 14.8	21.0	16 22 53.7	+5 14 37.8
21.5	293 37 54.7	1 3 36.8	21.5	346 8 2.3	4 45 47.0	21.5	22 52 15.5	5 7 49.7
22.0	300 40 22.7	1 39 37.7	22.0	352 53 38.6	4 58 10.9	22.0	29 17 12.5	4 57 14.3
22.5	307 41 33.4	2 14 1.0	22.5	359 35 46.8	5 6 22.8	22.5	35 38 3.8	4 43 6.1
23.0	314 41 22.6	2 46 15.8	23.0	6 14 30.7	5 10 22.4	23.0	41 55 9.3	4 25 40.9
23.5	321 39 45.5	+3 15 53.8	23.5	12 49 54.0	+5 10 12.7	23.5	48 8 48.2	+4 5 15.6
24.0	328 36 35.9	3 42 29.8	24.0	19 21 59.5	5 5 59.7	24.0	54 19 19.3	3 42 8.1
24.5	335 31 46.1	4 5 42.0	24.5	25 50 50.3	4 57 52.4	24.5	60 27 0.4	3 16 37.0
25.0	342 25 6.3	4 25 12.1	25.0	32 16 28.4	4 46 2.3	25.0	66 32 8.9	2 49 1.5
25.5	349 16 24.9	4 40 46.0	25.5	38 38 56.0	4 30 43.3	25.5	72 35 1.2	2 19 41.5
26.0	356 5 27.6	+4 52 13.7	26.0	44 58 15.7	+4 12 11.1	26.0	78 35 52.9	+1 48 57.1
26.5	2 51 59.1	4 59 29.3	26.5	51 14 30.2	3 50 43.5	26.5	84 34 59.2	1 17 9.0
27.0	9 35 42.9	5 2 31.6	27.0	57 27 43.2	3 26 39.5	27.0	90 32 35.0	0 44 37.7
27.5	16 16 22.7	5 1 23.0	27.5	63 37 59.9	3 0 19.2	27.5	96 28 54.8	+0 11 43.8
28.0	22 53 42.4	4 56 10.4	28.0	69 45 26.9	2 32 3.4	28.0	102 24 13.6	-0 21 12.5
28.5	29 27 27.8	+4 47 4.1	28.5	75 50 12.7	+2 2 13.5	28.5	108 18 46.6	-0 53 50.8
29.0	35 57 26.9	4 34 17.5	29.0	81 52 28.2	1 31 10.9	29.0	114 12 49.9	1 25 51.6
29.5	42 23 31.1	4 18 6.7	29.5	87 52 26.4	0 59 16.9	29.5	120 6 40.2	1 56 56.0
30.0	48 45 35.3	3 58 50.0	30.0	93 50 23.4	+0 26 52.2	30.0	126 0 35.6	2 26 45.5
30.5	55 3 38.8	3 36 47.4	30.5	99 46 37.4	-0 5 42.9	30.5	131 54 55.3	2 55 2.5
31.0	61 17 45.7	+3 12 19.6	31.0	105 41 29.2	-0 38 8.7	31.0	137 50 0.3	-3 21 30.3
31.5	67 28 4.4	+2 45 47.8	31.5	111 35 22.9	-1 10 6.2	31.5	143 46 12.9	-3 45 52.4

FOR GREENWICH MEANNOON.						
Data.	THE MOON'S EQUATOR.			☾ Mean Longitude of the Moon.	Mean Solar Days.	Motion of ☾
	i Inclination to the Earth's Equator.	Δ Ascending Node on Earth's Equator to Ascending Node on Ecliptic.	Ω' Ascending Node on Earth's Equator.			
Jan. 0	22 47.8	114 43.8	3 22.8	11 40.5	0.1	1 19.06
10	22 48.6	114 11.3	3 23.6	143 26.3	0.2	2 38.12
20	22 49.3	113 38.8	3 24.4	275 12.2	0.3	3 57.18
30	22 50.1	113 6.2	3 25.2	46 58.0	0.4	5 16.23
Feb. 9	22 50.8	112 33.7	3 26.0	178 43.9	0.5	6 35.29
					0.6	7 54.35
19	22 51.6	112 1.2	3 26.9	310 29.7	0.7	9 13.41
March 1	22 52.4	111 28.7	3 27.7	82 15.5	0.8	10 32.47
11	22 53.1	110 56.3	3 28.4	214 1.4	0.9	11 51.53
21	22 53.9	110 23.8	3 29.2	345 47.2	1.0	13 10.58
31	22 54.6	109 51.4	3 30.0	117 33.0	2.0	26 21.17
April 10	22 55.4	109 18.9	3 30.7	249 18.9	3.0	39 31.75
20	22 56.2	108 46.5	3 31.3	21 4.7	4.0	52 42.33
30	22 57.0	108 14.2	3 31.9	152 50.6	5.0	65 52.92
May 10	22 57.7	107 41.8	3 32.6	284 36.4	6.0	79 3.50
20	22 58.5	107 9.5	3 33.2	56 22.2	7.0	92 14.09
					8.0	105 24.67
30	22 59.3	106 37.1	3 33.9	188 8.1	9.0	118 35.25
June 9	23 0.1	106 4.8	3 34.5	319 53.9	10.0	131 45.84
19	23 0.9	105 32.6	3 35.1	91 39.7	Hours.	0 32.94
29	23 1.6	105 0.3	3 35.7	223 25.6	1	1 5.88
July 9	23 2.4	104 28.0	3 36.2	355 11.4	2	1 38.82
					3	2 11.76
19	23 3.2	103 55.7	3 36.7	126 57.3	4	2 44.70
29	23 4.0	103 23.6	3 37.2	258 43.1	5	3 17.65
Aug. 8	23 4.8	102 51.4	3 37.7	30 28.9	6	3 50.59
18	23 5.6	102 19.2	3 38.0	162 14.8	7	4 23.53
28	23 6.4	101 47.1	3 38.5	294 0.6	8	4 56.47
					9	5 29.41
Sept. 7	23 7.3	101 14.9	3 39.0	65 46.5	10	6 2.35
17	23 8.1	100 42.8	3 39.4	197 32.3	11	6 35.29
27	23 8.9	100 10.7	3 39.7	329 18.1	12	7 8.23
Oct. 7	23 9.7	99 38.6	3 40.0	101 4.0	13	7 41.17
17	23 10.5	99 6.5	3 40.3	232 49.8	14	8 14.11
					15	8 47.06
27	23 11.3	98 34.3	3 40.7	4 35.6	16	9 20.00
Nov. 6	23 12.1	98 2.3	3 40.9	136 21.5	17	9 52.94
16	23 12.9	97 30.3	3 41.2	268 7.3	18	10 25.88
26	23 13.7	96 58.3	3 41.4	39 53.2	19	10 58.82
Dec. 6	23 14.5	96 26.3	3 41.6	171 39.0	20	11 31.76
					21	12 4.70
16	23 15.3	95 54.3	3 41.9	303 24.8	22	12 37.64
26	23 16.1	95 22.4	3 42.1	75 10.7		
36	23 16.9	94 50.5	3 42.3	206 56.5	23	

TABLE FOR THE LIBRATION OF THE MOON.

Argument,  $(\Omega - \lambda)$  or  $(\Omega - \lambda + 180^\circ)$ .

$\Omega - \lambda$	$\Delta \lambda$	$\frac{1}{a}$	$B$		$\Omega - \lambda$	$\Delta \lambda$	$\frac{1}{a}$	$B$	
0	0.0	39	0 0.0	180	46	0.6	56	1 3.9	134
1	0.0	39	0 1.6	179	47	0.6	57	1 4.9	133
2	0.0	39	0 3.1	178	48	0.6	58	1 6.0	132
3	0.1	39	0 4.7	177	49	0.6	59	1 7.0	131
4	0.1	39	0 6.2	176	50	0.6	60	1 8.0	130
5	0.1	39	0 7.7	175	51	0.6	62	1 9.0	129
6	0.2	39	0 9.3	174	52	0.6	63	1 10.0	128
7	0.2	39	0 10.8	173	53	0.5	64	1 10.9	127
8	0.2	39	0 12.4	172	54	0.5	66	1 11.8	126
9	0.2	39	0 13.9	171	55	0.5	67	1 12.7	125
10	0.2	39	0 15.4	170	56	0.5	69	1 13.6	124
11	0.3	39	0 16.9	169	57	0.5	71	1 14.5	123
12	0.3	40	0 18.5	168	58	0.5	73	1 15.3	122
13	0.3	40	0 20.0	167	59	0.5	75	1 16.1	121
14	0.3	40	0 21.5	166	60	0.5	77	1 16.9	120
15	0.3	40	0 23.0	165	61	0.5	80	1 17.6	119
16	0.3	40	0 24.5	164	62	0.5	83	1 18.4	118
17	0.3	40	0 26.0	163	63	0.5	86	1 19.1	117
18	0.3	41	0 27.4	162	64	0.5	89	1 19.8	116
19	0.4	41	0 28.9	161	65	0.4	92	1 20.4	115
20	0.4	41	0 30.4	160	66	0.4	95	1 21.1	114
21	0.4	41	0 31.8	159	67	0.4	99	1 21.7	113
22	0.4	42	0 33.2	158	68	0.4	103	1 22.3	112
23	0.4	42	0 34.7	157	69	0.4	108	1 22.9	111
24	0.4	42	0 36.1	156	70	0.4	113	1 23.4	110
25	0.4	43	0 37.5	155	71	0.4	119	1 23.9	109
26	0.5	43	0 38.9	154	72	0.4	125	1 24.4	108
27	0.5	43	0 40.3	153	73	0.4	132	1 24.9	107
28	0.5	44	0 41.7	152	74	0.3	141	1 25.3	106
29	0.5	44	0 43.1	151	75	0.3	150	1 25.7	105
30	0.5	45	0 44.4	150	76	0.3	160	1 26.1	104
31	0.5	45	0 45.7	149	77	0.3	172	1 26.5	103
32	0.5	46	0 47.0	148	78	0.2	186	1 26.8	102
33	0.5	46	0 48.4	147	79	0.2	202	1 27.1	101
34	0.5	47	0 49.7	146	80	0.2	222	1 27.4	100
35	0.5	47	0 51.0	145	81	0.2	247	1 27.7	99
36	0.5	48	0 52.2	144	82	0.2	278	1 27.9	98
37	0.5	48	0 53.4	143	83	0.1	318	1 28.1	97
38	0.6	49	0 54.7	142	84	0.1	370	1 28.3	96
39	0.6	50	0 55.9	141	85	0.1	440	1 28.5	95
40	0.6	50	0 57.1	140	86	0.1	555	1 28.6	94
41	0.6	51	0 58.3	139	87	0.1	740	1 28.7	93
42	0.6	52	0 59.4	138	88	0.0	1110	1 28.7	92
43	0.6	53	1 0.6	137	89	0.0	2220	1 28.8	91
44	0.6	54	1 1.7	136	90	0.0	$\infty$	1 28.8	90
45	0.6	55	1 2.8	135					
	$\Delta \lambda$	$\frac{1}{a}$	$B$	$\Omega - \lambda$		$\Delta \lambda$	$\frac{1}{a}$	$B$	$\Omega - \lambda$

 $\Delta \lambda$  has the sign of  $\tan (\lambda - \Omega)$  $a$  has the sign of  $\cos (\Omega - \lambda)$  $B$  has the sign of  $\sin (\Omega - \lambda)$

FOR GREENWICH MEAN NOON.							
Date.	Apparent Obliquity of the Ecliptic. (HANSEN.)	Equation of Equinoxes. (HANSEN.)		Precession of Equinoxes in Longitude.	The Sun's		Mean Longitude of Moon's Ascending Node.
		In Longitude.	In R. A.		Aberration.	Hor. Par.	
Jan. 0	23 27 12.82	+ 15.58	+ 0.953	0.00	- 20.80	9.00	297 50.2
10	12.84	16.04	0.981	1.38	20.79	9.00	297 18.5
20	12.89	16.40	1.003	2.75	20.77	8.99	296 46.7
30	12.99	16.60	1.015	4.13	20.74	8.98	296 14.9
Feb. 9	13.09	16.66	1.019	5.50	20.71	8.96	295 43.1
19	23 27 13.18	+ 16.57	+ 1.013	6.88	- 20.67	8.94	295 11.4
March 1	13.22	16.34	0.999	8.26	20.63	8.92	294 39.6
11	13.23	16.03	0.981	9.63	20.57	8.90	294 7.8
21	13.16	15.68	0.959	11.01	20.51	8.87	293 36.0
31	13.03	15.32	0.937	12.38	20.45	8.85	293 4.3
April 10	23 27 12.83	+ 15.03	+ 0.919	13.76	- 20.39	8.82	292 32.5
20	12.61	14.84	0.908	15.14	20.34	8.80	292 0.7
30	12.35	14.77	0.903	16.51	20.29	8.78	291 29.0
May 10	12.07	14.83	0.907	17.89	20.24	8.76	290 57.2
20	11.81	15.01	0.918	19.26	20.19	8.74	290 25.4
30	23 27 11.58	+ 15.32	+ 0.937	20.64	- 20.16	8.72	289 53.6
June 9	11.39	15.73	0.962	22.02	20.13	8.71	289 21.9
19	11.25	16.18	0.990	23.39	20.11	8.71	288 50.1
29	11.18	16.65	1.018	24.77	20.11	8.70	288 18.3
July 9	11.17	17.07	1.044	26.14	20.10	8.70	287 46.6
19	23 27 11.20	+ 17.42	+ 1.065	27.52	- 20.12	8.71	287 14.8
29	11.25	17.66	1.080	28.90	20.14	8.72	286 43.0
Aug. 8	11.34	17.76	1.086	30.27	20.17	8.73	286 11.2
18	11.43	17.74	1.085	31.65	20.20	8.75	285 39.5
28	11.49	17.56	1.074	33.02	20.24	8.77	285 7.7
Sept. 7	23 27 11.50	+ 17.28	+ 1.057	34.40	- 20.29	8.79	284 35.9
17	11.48	16.93	1.035	35.78	20.35	8.81	284 4.1
27	11.39	16.55	1.012	37.15	20.41	8.84	283 32.4
Oct. 7	11.23	16.19	0.990	38.53	20.47	8.87	283 0.6
17	11.01	15.88	0.971	39.90	20.53	8.88	282 28.8
27	23 27 10.76	+ 15.69	+ 0.960	41.28	- 20.59	8.91	281 57.1
Nov. 6	10.49	15.65	0.957	42.66	20.64	8.93	281 25.3
16	10.20	15.76	0.964	44.03	20.69	8.95	280 53.5
26	9.94	16.00	0.979	45.41	20.73	8.97	280 21.7
Dec. 6	9.72	16.35	1.000	46.78	20.76	8.98	279 50.0
16	23 27 9.57	+ 16.77	+ 1.026	48.16	- 20.78	8.99	279 18.2
26	9.46	17.26	1.056	49.54	20.79	9.00	278 46.4
36	23 27 9.42	+ 17.70	+ 1.083	50.91	- 20.79	9.00	278 14.6
Mean Obliquity, 1898.0, 23° 27' 8".96 (HANSEN). Mean Obliquity, 1898.0, 23° 27' 8".69 (PETERS). Precession for 1898 . . . . . 50".2633 log = 1.70125 Precession in a Solar Day . . . . . 0".1376 log = 9.13867 Precession in a Sidereal Day . . . . . 0".1372 log = 9.13748 Sun's Mean Equatorial Horizontal Parallax . . . . . 8".848 log = 0.94685							Daily Motion of $\Omega$ -3'.177

PART II

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ASTRONOMICAL EPHEMERIS

FOR THE

MERIDIAN OF WASHINGTON

**FORMULÆ FOR THE REDUCTION OF THE POSITIONS OF THE FIXED STARS, USING THE NOTATION OF BESSEL, AND THE CONSTANTS OF PETERS AND STRUVE.**

**NOTATION.**

- $\tau$ , the time, reckoned in units of one year, from the beginning of the Besselian fictitious year, (1897, December 30<sup>d</sup>.618 = 1898, January 0<sup>d</sup>.0—0<sup>d</sup>.382, Washington mean time),  
 $a_0, \delta_0$ , the star's mean right ascension and declination at the beginning of the fictitious year,  
 $\alpha, \delta$ , the star's apparent right ascension and declination at the time  $\tau$ ,  
 $\mu, \mu'$ , the annual proper motion in right ascension and declination,  
 $\odot$ , the sun's true longitude,  
 $\Omega$ , the longitude of the moon's ascending node,  
 $\omega$ , the obliquity of the ecliptic,  
 $\Gamma$ , the longitude of the sun's perigee,  
 $\Gamma'$ , the longitude of the moon's perigee,  
 $\zeta$ , the moon's mean longitude.

**BESSELIAN STAR-NUMBERS.**

$$\begin{aligned} A &= \tau - 0.34251 \sin \Omega & - 0.00011 \sin (3 \odot - \Gamma) \\ &+ 0.00410 \sin 2 \Omega & - 0.00005 \sin 2 (\odot - \Omega) \\ &- 0.02519 \sin 2 \odot & + 0.00010 \sin 2 (\odot - \Gamma') \\ &+ 0.00293 \sin (\odot + 81^\circ 59') & + 0.00009 \sin (2 \Gamma' - \Omega) \\ &+ 0.00025 \sin (2 \odot - \Omega) & + 0.00005 \cos \Gamma' \\ &- 0.00405 \sin 2 \zeta & + 0.00004 \sin 2 \Gamma' \\ &+ 0.00135 \sin (\zeta - \Gamma') \\ B &= -9.2240 \cos \Omega & - 0.0027 \cos (3 \odot - \Gamma) \\ &+ 0.0895 \cos 2 \Omega & + 0.0067 \cos (2 \odot - \Omega) \\ &- 0.5506 \cos 2 \odot & + 0.0024 \cos (2 \Gamma' - \Omega) \\ &- 0.0092 \cos (\odot + 281^\circ 11') & - 0.0023 \sin \Gamma' \\ &- 0.0885 \cos 2 \zeta & + 0.0008 \cos 2 \Gamma' \\ C &= -20.4451 \cos \omega \cos \odot \\ D &= -20.4451 \sin \odot \\ E &= -0.0450 \sin \Omega + 0''.0014 \sin 2 \Omega - 0''.0032 \sin 2 \odot \end{aligned}$$

**BESSEL'S Star-Constants.**

$$\begin{aligned} a &= 3''.07268 + 1''.33682 \sin a_0 \tan \delta_0 = \text{precession in right ascension} \\ b &= \frac{1}{15} \cos a_0 \tan \delta_0 \\ c &= \frac{1}{15} \cos a_0 \sec \delta_0 \\ d &= \frac{1}{15} \sin a_0 \sec \delta_0 \\ a' &= 20''.0523 \cos a_0 = \text{precession in declination} \\ b' &= -\sin a_0 \\ c' &= \tan \omega \cos \delta_0 - \sin a_0 \sin \delta_0 \\ d' &= \cos a_0 \sin \delta_0 \end{aligned}$$

**Reduction to Apparent Position.**

$$\begin{aligned} \alpha &= a_0 + \tau \mu + Aa + Bb + Cc + Dd + \frac{1}{15} E & (\text{in time}) \\ \delta &= \delta_0 + \tau \mu' + Aa' + Bb' + Cc' + Dd' & (\text{in arc}) \end{aligned}$$

**INDEPENDENT STAR-NUMBERS.**

$$\begin{aligned} f &= 46''.0902 A + E \text{ (in arc)} = 3''.07268 A + \frac{1}{15} E & (\text{in time}) \\ g \sin G &= B & h \sin H &= C \\ g \cos G &= 20''.0523 A & h \cos H &= D & i &= C \tan \omega \end{aligned}$$

**Reduction to Apparent Position.**

$$\begin{aligned} \alpha &= a_0 + f + \tau \mu + \frac{1}{15} g \sin (G + a_0) \tan \delta_0 + \frac{1}{15} h \sin (H + a_0) \sec \delta_0 & (\text{in time}) \\ \delta &= \delta_0 + \tau \mu' + g \cos (G + a_0) + h \cos (H + a_0) \sin \delta_0 + i \cos \delta_0 & (\text{in arc}) \end{aligned}$$

**NOTES.**—(1) The independent star-numbers are more convenient, when only one or two apparent positions of a star are required, or when BESSEL'S star-constants are not known with sufficient accuracy. Otherwise, the Besselian star-numbers are more convenient.

(2) In using the star-constants of the *British Association Catalogue*,  $a, b, c, d, a', b', c', d'$ , must be changed to  $c, d, a, b, -c', -d', -a', -b'$ , respectively.



FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.
Jan. 0	+9.4910	-0.5909	-0.5485	+1.3027	Feb. 15	+9.6622	-0.6182	-1.1995	+1.0397
1	9.4944	0.5872	0.5869	1.3012	16	9.6666	0.6197	1.2043	1.0274
2	9.4989	0.5827	0.6221	1.2995	17	9.6706	0.6231	1.2089	1.0146
3	9.5044	0.5785	0.6545	1.2976	h 18	9.6739	0.6277	1.2133	1.0013
h 4	9.5108	0.5755	0.6845	1.2956	(10.0) 19	9.6764	0.6327	1.2175	0.9875
(7.0) 5	+9.5176	-0.5743	-0.7125	+1.2935	20	+9.6781	-0.6373	-1.2215	+0.9732
6	9.5245	0.5752	0.7386	1.2913	21	9.6790	0.6408	1.2254	0.9581
7	9.5309	0.5783	0.7631	1.2889	22	9.6795	0.6425	1.2291	0.9423
8	9.5364	0.5828	0.7862	1.2863	23	9.6799	0.6424	1.2326	0.9258
9	9.5410	0.5878	0.8080	1.2835	24	9.6805	0.6406	1.2360	0.9086
10	+9.5445	-0.5926	-0.8286	+1.2806	25	+9.6817	-0.6376	-1.2392	+0.8907
11	9.5472	0.5962	0.8481	1.2776	26	9.6835	0.6341	1.2422	0.8717
12	9.5494	0.5981	0.8667	1.2744	27	9.6860	0.6310	1.2451	0.8517
13	9.5516	0.5980	0.8844	1.2710	28	9.6891	0.6291	1.2479	0.8305
14	9.5544	0.5961	0.9013	1.2674	Mar. 1	9.6924	0.6288	1.2505	0.8081
15	+9.5579	-0.5929	-0.9173	+1.2637	2	+9.6956	-0.6304	-1.2530	+0.7844
16	9.5624	0.5893	0.9324	1.2598	3	9.6984	0.6335	1.2553	0.7593
17	9.5678	0.5862	0.9470	1.2557	4	9.7007	0.6378	1.2575	0.7325
18	9.5739	0.5845	0.9611	1.2515	h 5	9.7022	0.6417	1.2595	0.7039
h 19	9.5802	0.5848	0.9748	1.2471	(11.0) 6	9.7031	0.6452	1.2613	0.6730
(8.0) 20	+9.5863	-0.5872	-0.9880	+1.2426	7	+9.7035	-0.6474	-1.2630	+0.6397
21	9.5919	0.5914	1.0007	1.2379	8	9.7038	0.6478	1.2646	0.6035
22	9.5965	0.5967	1.0128	1.2330	9	9.7042	0.6463	1.2660	0.5639
23	9.6000	0.6023	1.0243	1.2278	10	9.7050	0.6433	1.2673	0.5202
24	9.6026	0.6072	1.0353	1.2224	11	9.7065	0.6393	1.2685	0.4714
25	+9.6044	-0.6107	-1.0457	+1.2168	12	+9.7088	-0.6352	-1.2695	+0.4164
26	9.6058	0.6123	1.0558	1.2110	13	9.7116	0.6316	1.2704	0.3534
27	9.6071	0.6120	1.0656	1.2050	14	9.7150	0.6293	1.2712	0.2794
28	9.6090	0.6101	1.0752	1.1988	15	9.7185	0.6288	1.2719	0.1902
29	9.6115	0.6072	1.0845	1.1924	16	9.7217	0.6301	1.2724	0.0777
30	+9.6147	-0.6042	-1.0936	+1.1857	17	+9.7245	-0.6327	-1.2727	+0.9254
31	9.6187	0.6020	1.1022	1.1788	18	9.7267	0.6361	1.2729	0.6884
Feb. 1	9.6232	0.6013	1.1105	1.1717	19	9.7280	0.6393	1.2730	+9.1244
2	9.6278	0.6025	1.1185	1.1643	h 20	9.7287	0.6416	1.2730	-9.3483
h 3	9.6322	0.6056	1.1262	1.1566	(12.0) 21	9.7290	0.6423	1.2729	9.7611
(9.0) 4	+9.6361	-0.6103	-1.1335	+1.1487	22	+9.7291	-0.6411	-1.2726	-9.9686
5	9.6391	0.6157	1.1406	1.1405	23	9.7293	0.6382	1.2722	0.1083
6	9.6414	0.6211	1.1475	1.1320	24	9.7299	0.6339	1.2717	0.2136
7	9.6429	0.6255	1.1542	1.1232	25	9.7312	0.6286	1.2711	0.2982
8	9.6440	0.6283	1.1607	1.1140	26	9.7331	0.6235	1.2703	0.3689
9	+9.6449	-0.6293	-1.1669	+1.1045	27	+9.7355	-0.6193	-1.2694	-0.4295
10	9.6461	0.6285	1.1729	1.0947	28	9.7383	0.6166	1.2684	0.4826
11	9.6478	0.6262	1.1787	1.0845	29	9.7411	0.6158	1.2672	0.5297
12	9.6504	0.6232	1.1842	1.0739	30	9.7437	0.6167	1.2658	0.5720
13	9.6538	0.6203	1.1895	1.0629	31	9.7459	0.6189	1.2643	0.6105
14	+9.6578	-0.6185	-1.1946	+1.0515	Apr. 1	+9.7474	-0.6214	-1.2627	-0.6457
15	+9.6622	-0.6182	-1.1995	+1.0397	2	+9.7483	-0.6236	-1.2610	-0.6780

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.
Apr. 1	+9.7474	-0.6214	-1.2627	-0.6457	May 17	+9.8276	-0.4968	-1.0066	-1.2355
2	9.7483	0.6236	1.2610	0.6780	18	9.8290	0.4883	0.9950	1.2401
3	9.7488	0.6246	1.2591	0.7080	19	9.8310	0.4791	0.9829	1.2445
h 4	9.7490	0.6239	1.2571	0.7360	h 20	9.8334	0.4704	0.9703	1.2487
(13.0) 5	9.7493	0.6212	1.2550	0.7620	(16.0) 21	9.8363	0.4635	0.9573	1.2527
6	+9.7500	-0.6166	-1.2527	-0.7865	22	+9.8393	-0.4590	-0.9438	-1.2566
7	9.7512	0.6108	1.2503	0.8006	23	9.8423	0.4574	0.9298	1.2604
8	9.7531	0.6044	1.2478	0.8314	24	9.8450	0.4582	0.9152	1.2641
9	9.7556	0.5984	1.2451	0.8521	25	9.8473	0.4605	0.9002	1.2677
10	9.7586	0.5936	1.2423	0.8716	26	9.8491	0.4633	0.8845	1.2711
11	+9.7619	-0.5905	-1.2394	-0.8902	27	+9.8505	-0.4651	-0.8680	-1.2743
12	9.7652	0.5895	1.2363	0.9079	28	9.8516	0.4651	0.8506	1.2773
13	9.7681	0.5902	1.2330	0.9247	29	9.8525	0.4625	0.8322	1.2802
14	9.7704	0.5920	1.2295	0.9407	30	9.8536	0.4573	0.8128	1.2829
15	9.7720	0.5939	1.2259	0.9560	31	9.8551	0.4496	0.7924	1.2855
16	+9.7732	-0.5952	-1.2221	-0.9707	June 1	+9.8570	-0.4407	-0.7711	-1.2879
17	9.7738	0.5949	1.2182	0.9848	2	9.8594	0.4313	0.7487	1.2902
18	9.7742	0.5927	1.2142	0.9984	3	9.8623	0.4231	0.7247	1.2924
h 19	9.7746	0.5884	1.2100	1.0114	h 4	9.8656	0.4172	0.6994	1.2945
(14.0) 20	9.7753	0.5824	1.2057	1.0238	(17.0) 5	9.8689	0.4143	0.6723	1.2964
21	+9.7767	-0.5751	-1.2012	-1.0358	6	+9.8721	-0.4145	-0.6434	-1.2982
22	9.7785	0.5677	1.1965	1.0473	7	9.8750	0.4172	0.6120	1.2999
23	9.7810	0.5610	1.1916	1.0584	8	9.8774	0.4213	0.5785	1.3015
24	9.7837	0.5557	1.1865	1.0692	9	9.8793	0.4254	0.5418	1.3030
25	9.7866	0.5525	1.1812	1.0796	10	9.8807	0.4278	0.5016	1.3043
26	+9.7894	-0.5516	-1.1757	-1.0896	11	+9.8819	-0.4280	-0.4571	-1.3055
27	9.7918	0.5522	1.1700	1.0993	12	9.8829	0.4254	0.4074	1.3065
28	9.7938	0.5539	1.1642	1.1086	13	9.8840	0.4199	0.3513	1.3074
29	9.7952	0.5555	1.1582	1.1175	14	9.8854	0.4122	0.2864	1.3082
30	9.7962	0.5561	1.1520	1.1260	15	9.8872	0.4034	0.2102	1.3089
May 1	+9.7968	-0.5547	-1.1456	-1.1343	16	+9.8894	-0.3950	-0.1178	-1.3095
2	9.7975	0.5512	1.1389	1.1423	17	9.8921	0.3882	0.9998	1.3100
3	9.7984	0.5455	1.1320	1.1501	18	9.8949	0.3844	0.9373	1.3103
4	9.7997	0.5380	1.1248	1.1577	h 19	9.8977	0.3839	0.8742	1.3105
h 5	9.8017	0.5295	1.1174	1.1651	(18.0) 20	9.9004	0.3866	-0.8011	1.3106
(15.0) 6	+9.8042	-0.5212	-1.1098	-1.1722	21	+9.9027	-0.3914	+0.3957	-1.3106
7	9.8073	0.5139	1.1019	1.1790	22	9.9046	0.3974	0.7488	1.3104
8	9.8106	0.5088	1.0937	1.1856	23	9.9060	0.4025	0.9409	1.3101
9	9.8140	0.5061	1.0852	1.1919	24	9.9071	0.4058	0.0735	1.3097
10	9.8172	0.5057	1.0765	1.1980	25	9.9081	0.4064	0.1749	1.3092
11	+9.8199	-0.5069	-1.0675	-1.2039	26	+9.9091	-0.4040	+0.2569	-1.3086
12	9.8221	0.5089	1.0581	1.2096	27	9.9103	0.3987	0.3258	1.3078
13	9.8237	0.5104	1.0484	1.2151	28	9.9119	0.3918	0.3850	1.3069
14	9.8248	0.5105	1.0384	1.2205	29	9.9140	0.3841	0.4371	1.3059
15	9.8257	0.5084	1.0281	1.2257	30	9.9165	0.3773	0.4835	1.3048
16	+9.8265	-0.5037	-1.0176	-1.2307	July 1	+9.9194	-0.3727	+0.5253	-1.3035
17	+9.8276	-0.4968	-1.0066	-1.2355	2	+9.9223	-0.3713	+0.5633	-1.3021

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.
July 1	+9.9194	-0.3727	+0.5253	-1.3035	Aug. 16	+9.9906	-0.4452	+1.1826	-1.0770
2	9.9223	0.3713	0.5633	1.3021	17	9.9912	0.4519	1.1878	1.0666
3	9.9252	0.3735	0.5981	1.3006	18	9.9915	0.4563	1.1928	1.0558
h 4	9.9279	0.3786	0.6301	1.2990	h 19	9.9918	0.4579	1.1976	1.0446
(19.0) 5	9.9301	0.3855	0.6601	1.2973	(22.0) 20	9.9921	0.4569	1.2022	1.0330
6	+9.9319	-0.3927	+0.6878	-1.2955	21	+9.9927	-0.4535	+1.2066	-1.0210
7	9.9332	0.3988	0.7138	1.2935	22	9.9936	0.4487	1.2109	1.0086
8	9.9343	0.4027	0.7383	1.2913	23	9.9949	0.4437	1.2150	0.9957
9	9.9351	0.4036	0.7613	1.2890	24	9.9965	0.4399	1.2190	0.9823
10	9.9360	0.4014	0.7830	1.2866	25	9.9984	0.4383	1.2228	0.9682
11	+9.9371	-0.3968	+0.8036	-1.2840	26	+0.0003	-0.4394	+1.2265	-0.9535
12	9.9385	0.3906	0.8231	1.2813	27	0.0021	0.4433	1.2300	0.9382
13	9.9402	0.3843	0.8417	1.2785	28	0.0037	0.4489	1.2334	0.9223
14	9.9423	0.3794	0.8594	1.2756	29	0.0049	0.4561	1.2366	0.9058
15	9.9447	0.3770	0.8763	1.2725	30	0.0057	0.4626	1.2396	0.8884
16	+9.9471	-0.3782	+0.8925	-1.2693	31	+0.0062	-0.4678	+1.2425	-0.8699
17	9.9494	0.3826	0.9080	1.2659	Sept. 1	0.0064	0.4705	1.2453	0.8504
18	9.9514	0.3895	0.9228	1.2623	2	0.0066	0.4705	1.2480	0.8299
19	9.9530	0.3976	0.9370	1.2586	h 3	0.0068	0.4678	1.2506	0.8083
h 20	9.9543	0.4056	0.9505	1.2548	(23.0) 4	0.0072	0.4631	1.2530	0.7854
(20.0) 21	+9.9552	-0.4119	+0.9636	-1.2508	5	+0.0080	-0.4574	+1.2552	-0.7612
22	9.9558	0.4156	0.9763	1.2466	6	0.0091	0.4518	1.2573	0.7353
23	9.9565	0.4164	0.9885	1.2423	7	0.0104	0.4478	1.2592	0.7078
24	9.9573	0.4142	1.0003	1.2378	8	0.0119	0.4460	1.2610	0.6781
25	9.9583	0.4099	1.0116	1.2332	9	0.0134	0.4471	1.2627	0.6461
26	+9.9598	-0.4046	+1.0225	-1.2284	10	+0.0148	-0.4506	+1.2643	-0.6114
27	9.9617	0.3996	1.0330	1.2234	11	0.0159	0.4559	1.2657	0.5736
28	9.9639	0.3964	1.0431	1.2182	12	0.0166	0.4617	1.2670	0.5320
29	9.9663	0.3961	1.0528	1.2128	13	0.0170	0.4668	1.2682	0.4857
30	9.9687	0.3989	1.0622	1.2072	14	0.0172	0.4700	1.2692	0.4340
31	+9.9709	-0.4046	+1.0713	-1.2014	15	+0.0172	-0.4708	+1.2701	-0.3752
Aug. 1	9.9728	0.4123	1.0802	1.1954	16	0.0173	0.4689	1.2709	0.3063
2	9.9742	0.4207	1.0888	1.1893	17	0.0175	0.4644	1.2716	0.2248
3	9.9754	0.4283	1.0971	1.1830	18	0.0181	0.4576	1.2721	0.1239
h 4	9.9761	0.4341	1.1051	1.1765	19	0.0190	0.4504	1.2725	9.9919
(21.0) 5	+9.9766	-0.4371	+1.1128	-1.1697	h (0.0) 20	+0.0203	-0.4439	+1.2728	-9.8010
6	9.9771	0.4372	1.1203	1.1626	21	0.0218	0.4392	1.2730	-9.4521
7	9.9777	0.4346	1.1275	1.1552	22	0.0235	0.4371	1.2731	+8.8228
8	9.9786	0.4303	1.1344	1.1476	23	0.0252	0.4378	1.2730	9.6191
9	9.9798	0.4254	1.1411	1.1398	24	0.0266	0.4408	1.2728	9.8839
10	+9.9813	-0.4213	+1.1476	-1.1317	25	+0.0278	-0.4453	+1.2725	+0.0473
11	9.9831	0.4192	1.1539	1.1233	26	0.0286	0.4498	1.2720	0.1657
12	9.9850	0.4199	1.1600	1.1146	27	0.0290	0.4532	1.2714	0.2587
13	9.9868	0.4238	1.1660	1.1057	28	0.0292	0.4544	1.2707	0.3352
14	9.9884	0.4298	1.1718	1.0965	29	0.0293	0.4528	1.2699	0.4001
15	+9.9897	-0.4374	+1.1773	-1.0870	30	+0.0294	-0.4483	+1.2689	+0.4564
16	+9.9906	-0.4452	+1.1826	-1.0770	Oct. 1	+0.0297	-0.4413	+1.2677	+0.5063

## FOR WASHINGTON MEAN MIDNIGHT

Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.	Solar Day. (Sid. Hour.)	Log A.	Log B.	Log C.	Log D.
Oct. 1	+0.0297	-0.4413	+1.2677	+0.5063	Nov. 16	+0.0749	-0.1876	+1.0326	+1.2235
2	0.0303	0.4326	1.2664	0.5508	17	0.0768	0.1854	1.0216	1.2288
3	0.0312	0.4239	1.2650	0.5911	18	0.0785	0.1872	1.0101	1.2339
h 4	0.0324	0.4163	1.2635	0.6279	(4.0) 19	0.0798	0.1911	0.9981	1.2388
(1.0) 5	0.0338	0.4105	1.2618	0.6617	20	0.0809	0.1948	0.9856	1.2434
6	+0.0352	-0.4078	+1.2600	+0.6930	21	+0.0817	-0.1959	+0.9725	+1.2479
7	0.0366	0.4080	1.2581	0.7221	22	0.0823	0.1928	0.9588	1.2523
8	0.0377	0.4105	1.2561	0.7491	23	0.0829	0.1846	0.9446	1.2565
9	0.0385	0.4140	1.2539	0.7746	24	0.0835	0.1713	0.9299	1.2605
10	0.0391	0.4173	1.2515	0.7985	25	0.0844	0.1538	0.9146	1.2643
11	+0.0394	-0.4188	+1.2490	+0.8212	26	+0.0855	-0.1340	+0.8987	+1.2679
12	0.0395	0.4178	1.2463	0.8426	27	0.0869	0.1142	0.8820	1.2713
13	0.0396	0.4137	1.2435	0.8629	28	0.0885	0.0974	0.8644	1.2746
14	0.0398	0.4064	1.2405	0.8821	29	0.0903	0.0858	0.8458	1.2778
15	0.0404	0.3967	1.2374	0.9004	30	0.0921	0.0807	0.8261	1.2808
16	+0.0412	-0.3857	+1.2342	+0.9178	Dec. 1	+0.0937	-0.0818	+0.8053	+1.2837
17	0.0425	0.3747	1.2308	0.9343	2	0.0951	0.0872	0.7835	1.2865
18	0.0440	0.3655	1.2273	0.9501	3	0.0963	0.0944	0.7604	1.2891
h 19	0.0457	0.3590	1.2236	0.9653	(5.0) 4	0.0972	0.1003	0.7358	1.2915
(2.0) 20	0.0474	0.3558	1.2197	0.9799	5	0.0978	0.1022	0.7097	1.2937
21	+0.0490	-0.3557	+1.2156	+0.9939	6	+0.0984	-0.0986	+0.6816	+1.2958
22	0.0504	0.3578	1.2113	1.0074	7	0.0990	0.0888	0.6514	1.2977
23	0.0514	0.3609	1.2069	1.0204	8	0.0998	0.0730	0.6188	1.2995
24	0.0522	0.3628	1.2023	1.0329	9	0.1008	0.0528	0.5834	1.3012
25	0.0526	0.3626	1.1975	1.0449	10	0.1022	0.0305	0.5447	1.3028
26	+0.0529	-0.3592	+1.1925	+1.0564	11	+0.1039	-0.0097	+0.5021	+1.3042
27	0.0532	0.3522	1.1873	1.0673	12	0.1057	9.9939	0.4547	1.3054
28	0.0536	0.3418	1.1819	1.0779	13	0.1077	9.9855	0.4014	1.3065
29	0.0542	0.3290	1.1763	1.0882	14	0.1098	9.9855	0.3403	1.3075
30	0.0553	0.3151	1.1705	1.0982	15	0.1115	9.9932	0.2689	1.3084
31	+0.0566	-0.3019	+1.1645	+1.1078	16	+0.1130	-0.0049	+0.1835	+1.3091
Nov. 1	0.0581	0.2910	1.1584	1.1171	17	0.1142	0.0172	0.0768	1.3096
2	0.0597	0.2837	1.1521	1.1260	18	0.1152	0.0264	9.9347	1.3100
h 3	0.0613	0.2805	1.1455	1.1346	(6.0) 19	0.1160	0.0303	9.7220	1.3103
(3.0) 4	0.0627	0.2808	1.1386	1.1429	20	0.1166	0.0272	+9.2871	1.3105
5	+0.0638	-0.2832	+1.1313	+1.1510	21	+0.1173	-0.0168	-9.1449	+1.3106
6	0.0647	0.2860	1.1238	1.1588	22	0.1182	0.0002	9.6748	1.3105
7	0.0653	0.2872	1.1160	1.1663	23	0.1192	9.9795	9.9066	1.3103
8	0.0657	0.2853	1.1080	1.1736	24	0.1205	9.9582	0.0568	1.3099
9	0.0661	0.2795	1.0998	1.1806	25	0.1221	9.9404	0.1680	1.3093
10	+0.0665	-0.2693	+1.0913	+1.1874	26	+0.1238	-9.9297	-0.2564	+1.3086
11	0.0672	0.2555	1.0824	1.1940	27	0.1255	9.9285	0.3297	1.3078
12	0.0682	0.2392	1.0731	1.2003	28	0.1271	9.9364	0.3923	1.3069
13	0.0695	0.2222	1.0635	1.2064	29	0.1286	9.9513	0.4469	1.3058
14	0.0712	0.2067	1.0535	1.2123	30	0.1298	9.9692	0.4952	1.3045
15	+0.0730	-0.1947	+1.0432	+1.2180	31	+0.1307	-9.9862	-0.5386	+1.3031
16	+0.0749	-0.1876	+1.0326	+1.2235	32	+0.1314	-9.9986	-0.5779	+1.3016

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
Jan.	0	0.0024	+14.32	+0.955	327 53	21 51.4	350 1	+0.8653	+1.3094	-1.53	-0.1857
	1	0.0051	14.43	0.962	328 18	21 53.2	349 5	0.8668	1.3092	1.68	0.2242
	2	0.0079	14.58	0.972	328 50	21 55.3	348 9	0.8688	1.3089	1.82	0.2596
	3	0.0106	14.76	0.984	329 24	21 57.6	347 12	0.8718	1.3086	1.95	0.2917
	4	0.0134	14.98	0.999	329 56	21 59.7	346 15	0.8757	1.3083	2.09	0.3217
	5	0.0161	+15.22	+1.015	330 24	22 1.6	345 18	+0.8806	+1.3080	-2.23	-0.3497
	6	0.0188	15.46	1.031	330 44	22 2.9	344 21	0.8860	1.3077	2.37	0.3760
	7	0.0216	15.69	1.046	330 55	22 3.7	343 24	0.8916	1.3073	2.51	0.4006
	8	0.0243	15.89	1.059	330 59	22 3.9	342 27	0.8969	1.3069	2.65	0.4237
	9	0.0271	16.06	1.071	330 57	22 3.8	341 30	0.9016	1.3065	2.79	0.4454
	10	0.0298	+16.18	+1.079	330 53	22 3.5	340 32	+0.9054	+1.3061	-2.92	-0.4659
	11	0.0325	16.29	1.086	330 50	22 3.3	339 35	0.9083	1.3057	3.06	0.4855
	12	0.0353	16.37	1.091	330 51	22 3.4	338 37	0.9104	1.3053	3.19	0.5041
	13	0.0380	16.46	1.097	330 58	22 3.9	337 40	0.9121	1.3048	3.33	0.5218
	14	0.0408	16.56	1.104	331 14	22 4.9	336 43	0.9138	1.3043	3.46	0.5388
	15	0.0435	+16.69	+1.113	331 36	22 6.4	335 45	+0.9158	+1.3038	-3.59	-0.5547
	16	0.0462	16.87	1.125	332 3	22 8.2	334 47	0.9185	1.3033	3.72	0.5701
	17	0.0490	17.08	1.139	332 31	22 10.1	333 49	0.9220	1.3028	3.84	0.5848
	18	0.0517	17.32	1.155	332 56	22 11.7	332 51	0.9265	1.3023	3.97	0.5989
	19	0.0545	17.57	1.171	333 15	22 13.0	331 53	0.9316	1.3017	4.09	0.6125
	20	0.0572	+17.82	+1.188	333 27	22 13.8	330 54	+0.9369	+1.3011	-4.22	-0.6255
	21	0.0599	18.05	1.203	333 31	22 14.1	329 56	0.9422	1.3006	4.34	0.6380
	22	0.0627	18.24	1.216	333 29	22 13.9	328 58	0.9470	1.3000	4.46	0.6500
	23	0.0654	18.39	1.226	333 23	22 13.5	327 59	0.9509	1.2994	4.58	0.6615
	24	0.0682	18.50	1.233	333 15	22 13.0	327 0	0.9540	1.2988	4.70	0.6726
	25	0.0709	+18.58	+1.239	333 10	22 12.7	326 1	+0.9561	+1.2982	-4.82	-0.6833
	26	0.0736	18.64	1.243	333 9	22 12.6	325 1	0.9575	1.2976	4.94	0.6935
	27	0.0764	18.69	1.246	333 14	22 12.9	324 2	0.9585	1.2970	5.05	0.7034
	28	0.0791	18.78	1.252	333 26	22 13.7	323 2	0.9597	1.2963	5.16	0.7130
	29	0.0819	18.88	1.259	333 43	22 14.9	322 2	0.9611	1.2957	5.27	0.7222
	30	0.0846	+19.02	+1.268	334 3	22 16.2	321 1	+0.9631	+1.2950	-5.38	-0.7311
	31	0.0873	19.19	1.279	334 22	22 17.5	320 1	0.9659	1.2943	5.48	0.7397
Feb.	1	0.0901	19.39	1.293	334 38	22 18.5	319 1	0.9694	1.2937	5.59	0.7480
	2	0.0928	19.60	1.307	334 48	22 19.2	318 1	0.9734	1.2930	5.69	0.7560
	3	0.0956	19.80	1.320	334 52	22 19.5	317 0	0.9776	1.2924	5.80	0.7637
	4	0.0983	+19.98	+1.332	334 50	22 19.3	316 0	+0.9816	+1.2917	-5.90	-0.7710
	5	0.1010	20.12	1.341	334 43	22 18.9	314 59	0.9851	1.2910	5.99	0.7781
	6	0.1037	20.22	1.348	334 33	22 18.2	313 58	0.9879	1.2904	6.09	0.7850
	7	0.1065	20.29	1.353	334 24	22 17.6	312 57	0.9900	1.2897	6.18	0.7917
	8	0.1092	20.35	1.357	334 19	22 17.3	311 55	0.9914	1.2891	6.28	0.7982
	9	0.1119	+20.38	+1.359	334 19	22 17.3	310 53	+0.9923	+1.2884	-6.37	-0.8043
	10	0.1146	20.44	1.363	334 25	22 17.7	309 51	0.9931	1.2877	6.45	0.8102
	11	0.1174	20.52	1.368	334 37	22 18.5	308 49	0.9941	1.2871	6.54	0.8159
	12	0.1201	20.65	1.377	334 54	22 19.6	307 47	0.9957	1.2864	6.62	0.8215
	13	0.1229	20.81	1.387	335 13	22 20.9	306 45	0.9980	1.2858	6.71	0.8269
	14	0.1256	+21.00	+1.400	335 31	22 22.1	305 43	+1.0009	+1.2852	-6.79	-0.8321
	15	0.1283	+21.21	+1.414	335 45	22 23.0	304 41	+1.0045	+1.2846	-6.87	-0.8371

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	r	f		G		H		Log g.	Log h.	i	Log i.
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	y	"	"	"	"	"	"			"	
Feb. 15	0.1283	+21.21	+1.414	335 45	22 23.0	304 41	20 18.7	+1.0045	+1.2846	-6.87	-0.8371
16	0.1311	21.43	1.429	335 53	22 23.5	303 38	20 14.5	1.0085	1.2840	6.94	0.8419
17	0.1338	21.63	1.442	335 55	22 23.7	302 35	20 10.3	1.0124	1.2834	7.02	0.8465
h 18	0.1366	21.79	1.453	335 51	22 23.4	301 32	20 6.1	1.0159	1.2828	7.09	0.8509
(10.0) 19	0.1393	21.92	1.461	335 44	22 22.9	300 29	20 1.9	1.0188	1.2822	7.16	0.8550
20	0.1420	+22.00	+1.467	335 35	22 22.3	299 26	19 57.7	+1.0210	+1.2816	-7.22	-0.8590
21	0.1448	22.05	1.470	335 27	22 21.8	298 23	19 53.5	1.0224	1.2810	7.29	0.8629
22	0.1475	22.08	1.472	335 24	22 21.6	297 20	19 49.3	1.0230	1.2805	7.35	0.8666
23	0.1503	22.10	1.473	335 25	22 21.7	296 16	19 45.1	1.0234	1.2799	7.41	0.8702
24	0.1530	22.13	1.475	335 32	22 22.1	295 12	19 40.8	1.0236	1.2794	7.47	0.8736
25	0.1557	+22.19	+1.479	335 45	22 23.0	294 8	19 36.5	+1.0240	+1.2789	-7.52	-0.8768
26	0.1585	22.28	1.485	336 1	22 24.1	293 4	19 32.3	1.0249	1.2784	7.58	0.8798
27	0.1612	22.41	1.494	336 17	22 25.1	292 0	19 28.0	1.0265	1.2780	7.63	0.8827
28	0.1640	22.57	1.505	336 31	22 26.1	290 56	19 23.7	1.0288	1.2776	7.68	0.8855
Mar. 1	0.1667	22.74	1.516	336 42	22 26.8	289 52	19 19.5	1.0315	1.2772	7.73	0.8881
2	0.1694	+22.91	+1.527	336 46	22 27.1	288 48	19 15.2	+1.0345	+1.2768	-7.77	-0.8906
3	0.1722	23.05	1.537	336 46	22 27.1	287 43	19 10.9	1.0374	1.2764	7.81	0.8929
4	0.1749	23.18	1.545	336 40	22 26.7	286 38	19 6.5	1.0400	1.2760	7.85	0.8950
h 5	0.1777	23.26	1.551	336 33	22 26.2	285 33	19 2.2	1.0419	1.2756	7.89	0.8970
(11.0) 6	0.1804	23.31	1.554	336 25	22 25.7	284 28	18 57.9	1.0432	1.2753	7.92	0.8988
7	0.1831	+23.33	+1.555	336 20	22 25.3	283 24	18 53.6	+1.0439	+1.2750	-7.95	-0.9005
8	0.1859	23.34	1.556	336 20	22 25.3	282 19	18 49.3	1.0442	1.2747	7.98	0.9020
9	0.1886	23.36	1.557	336 26	22 25.7	281 14	18 44.9	1.0442	1.2744	8.00	0.9034
10	0.1914	23.40	1.560	336 36	22 26.4	280 9	18 40.6	1.0445	1.2742	8.03	0.9047
11	0.1941	23.49	1.566	336 52	22 27.5	279 4	18 36.3	1.0451	1.2740	8.05	0.9060
12	0.1968	+23.62	+1.575	337 10	22 28.7	277 59	18 31.9	+1.0464	+1.2738	-8.07	-0.9072
13	0.1996	23.76	1.584	337 28	22 29.9	276 54	18 27.6	1.0483	1.2737	8.09	0.9082
14	0.2023	23.96	1.597	337 44	22 30.9	275 49	18 23.3	1.0509	1.2735	8.10	0.9090
15	0.2051	24.15	1.610	337 55	22 31.7	274 44	18 18.9	1.0538	1.2734	8.12	0.9095
16	0.2078	24.33	1.622	338 1	22 32.1	273 38	18 14.5	1.0567	1.2733	8.13	0.9098
17	0.2105	+24.48	+1.632	338 1	22 32.1	272 33	18 10.2	+1.0595	+1.2733	-8.13	-0.9101
18	0.2132	24.61	1.641	337 58	22 31.9	271 28	18 5.9	1.0618	1.2733	8.14	0.9103
19	0.2160	24.67	1.645	337 53	22 31.5	270 23	18 1.5	1.0634	1.2732	8.14	0.9104
h 20	0.2187	24.72	1.648	337 48	22 31.2	269 18	17 57.2	1.0643	1.2732	8.14	0.9105
(12.0) 21	0.2214	24.73	1.649	337 47	22 31.1	268 14	17 52.9	1.0647	1.2732	8.14	0.9104
22	0.2241	+24.74	+1.649	337 51	22 31.4	267 9	17 48.6	+1.0646	+1.2733	-8.13	-0.9102
23	0.2269	24.75	1.650	337 59	22 31.9	266 4	17 44.3	1.0644	1.2734	8.12	0.9098
24	0.2296	24.79	1.653	338 13	22 32.9	264 59	17 39.9	1.0643	1.2735	8.11	0.9093
25	0.2324	24.86	1.657	338 31	22 34.1	263 55	17 35.7	1.0647	1.2736	8.10	0.9086
26	0.2351	24.97	1.665	338 49	22 35.3	262 51	17 31.4	1.0657	1.2737	8.09	0.9078
27	0.2378	+25.11	+1.674	339 7	22 36.5	261 46	17 27.1	+1.0672	+1.2739	-8.07	-0.9069
28	0.2406	25.26	1.684	339 21	22 37.4	260 42	17 22.8	1.0693	1.2741	8.05	0.9059
29	0.2433	25.43	1.695	339 31	22 38.1	259 37	17 18.5	1.0717	1.2743	8.03	0.9047
30	0.2461	25.59	1.706	339 35	22 38.3	258 33	17 14.2	1.0742	1.2745	8.01	0.9034
h 31	0.2488	25.71	1.714	339 35	22 38.3	257 29	17 9.9	1.0763	1.2747	7.98	0.9020
Apr. 1	0.2515	+25.80	+1.720	339 33	22 38.2	256 25	17 5.7	+1.0779	+1.2750	-7.95	-0.9004
2	0.2543	+25.85	+1.723	339 29	22 37.9	255 21	17 1.4	+1.0790	+1.2753	-7.92	-0.8987

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $A$ .	$i$	Log $i$ .
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
	$y$	"	s	"	h m	"	h m			"	
Apr. 1	0.2515	+25.80	+1.720	339 33	22 38.2	256 25	17 5.7	+1.0779	+1.2750	-7.95	-0.9004
2	0.2543	25.85	1.723	339 29	22 37.9	255 21	17 1.4	1.0790	1.2753	7.92	0.8987
3	0.2570	25.88	1.725	339 28	22 37.9	254 18	16 57.2	1.0795	1.2756	7.89	0.8968
h 4	0.2598	25.90	1.727	339 30	22 38.0	253 15	16 53.0	1.0796	1.2760	7.85	0.8948
(13.0) 5	0.2625	25.91	1.727	339 38	22 38.5	252 12	16 48.7	1.0795	1.2764	7.81	0.8926
6	0.2652	+25.96	+1.730	339 51	22 39.4	251 9	16 44.6	+1.0796	+1.2768	-7.77	-0.8903
7	0.2680	26.03	1.735	340 9	22 40.6	250 6	16 40.4	1.0800	1.2772	7.73	0.8879
8	0.2707	26.14	1.743	340 30	22 42.0	249 3	16 36.2	1.0809	1.2776	7.68	0.8853
9	0.2735	26.29	1.753	340 51	22 43.4	248 0	16 32.0	1.0825	1.2780	7.63	0.8826
10	0.2762	26.47	1.765	341 10	22 44.7	246 57	16 27.8	1.0847	1.2785	7.58	0.8798
11	0.2789	+26.68	+1.779	341 26	22 45.7	245 55	16 23.7	+1.0873	+1.2790	-7.53	-0.8768
12	0.2817	26.88	1.792	341 36	22 46.4	244 53	16 19.5	1.0902	1.2795	7.48	0.8737
13	0.2844	27.06	1.804	341 41	22 46.7	243 51	16 15.4	1.0929	1.2800	7.42	0.8705
14	0.2872	27.20	1.813	341 42	22 46.8	242 49	16 11.3	1.0951	1.2805	7.36	0.8671
15	0.2899	27.31	1.821	341 41	22 46.7	241 47	16 7.1	1.0968	1.2810	7.30	0.8636
16	0.2926	+27.38	+1.825	341 41	22 46.7	240 46	16 3.1	+1.0980	+1.2815	-7.23	-0.8599
17	0.2954	27.42	1.828	341 44	22 46.9	239 44	15 58.9	1.0985	1.2820	7.17	0.8561
18	0.2981	27.45	1.830	341 49	22 47.3	238 43	15 54.9	1.0986	1.2826	7.10	0.8521
h 19	0.3009	27.48	1.832	342 0	22 48.0	237 42	15 50.8	1.0986	1.2832	7.04	0.8479
(14.0) 20	0.3036	27.51	1.834	342 16	22 49.1	236 41	15 46.7	1.0986	1.2838	6.97	0.8434
21	0.3063	+27.60	+1.840	342 36	22 50.4	235 41	15 42.7	+1.0992	+1.2844	-6.90	-0.8388
22	0.3091	27.72	1.848	342 56	22 51.7	234 41	15 38.7	1.1003	1.2850	6.83	0.8341
23	0.3118	27.88	1.859	343 17	22 53.1	233 40	15 34.7	1.1020	1.2856	6.75	0.8292
24	0.3146	28.05	1.870	343 34	22 54.3	232 40	15 30.7	1.1040	1.2862	6.67	0.8241
25	0.3173	28.23	1.882	343 47	22 55.1	231 40	15 26.7	1.1064	1.2868	6.59	0.8188
26	0.3200	+28.42	+1.895	343 55	22 55.7	230 41	15 22.7	+1.1090	+1.2874	-6.51	-0.8133
27	0.3228	28.59	1.906	343 58	22 55.9	229 41	15 18.7	1.1112	1.2880	6.43	0.8077
28	0.3255	28.71	1.914	343 59	22 55.9	228 42	15 14.8	1.1132	1.2886	6.34	0.8019
29	0.3283	28.80	1.920	343 59	22 55.9	227 43	15 10.9	1.1146	1.2892	6.25	0.7959
30	0.3310	28.87	1.925	344 0	22 56.0	226 44	15 6.9	1.1155	1.2899	6.16	0.7897
May 1	0.3337	+28.91	+1.927	344 4	22 56.3	225 45	15 3.0	+1.1160	+1.2905	-6.07	-0.7833
2	0.3365	28.96	1.930	344 12	22 56.8	224 47	14 59.1	1.1164	1.2911	5.98	0.7767
3	0.3392	29.01	1.934	344 26	22 57.7	223 49	14 55.3	1.1168	1.2918	5.88	0.7698
4	0.3420	29.10	1.940	344 44	22 58.9	222 51	14 51.4	1.1175	1.2924	5.79	0.7626
h 5	0.3447	29.23	1.949	345 5	23 0.3	221 53	14 47.5	1.1188	1.2931	5.69	0.7551
(15.0) 6	0.3474	+29.41	+1.961	345 26	23 1.7	220 55	14 43.7	+1.1206	+1.2938	-5.59	-0.7474
7	0.3501	29.61	1.974	345 46	23 3.1	219 57	14 39.8	1.1231	1.2944	5.49	0.7394
8	0.3529	29.84	1.989	346 1	23 4.1	219 0	14 36.0	1.1259	1.2950	5.39	0.7312
9	0.3556	30.07	2.005	346 12	23 4.8	218 3	14 32.2	1.1289	1.2956	5.29	0.7227
10	0.3583	30.30	2.020	346 19	23 5.3	217 6	14 28.4	1.1319	1.2962	5.18	0.7140
11	0.3610	+30.49	+2.033	346 22	23 5.5	216 10	14 24.7	+1.1345	+1.2968	-5.07	-0.7050
12	0.3638	30.65	2.043	346 22	23 5.5	215 14	14 20.9	1.1367	1.2974	4.96	0.6957
13	0.3665	30.75	2.050	346 23	23 5.5	214 18	14 17.2	1.1383	1.2980	4.85	0.6860
14	0.3693	30.84	2.056	346 24	23 5.6	213 22	14 13.5	1.1394	1.2986	4.74	0.6760
15	0.3720	30.89	2.059	346 30	23 6.0	212 26	14 9.7	1.1401	1.2991	4.63	0.6657
16	0.3747	+30.95	+2.063	346 40	23 6.7	211 30	14 6.0	+1.1406	+1.2997	-4.52	-0.6550
17	0.3775	+31.02	+2.068	346 54	23 7.6	210 34	14 2.3	+1.1413	+1.3002	-4.40	-0.6439

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .	
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.					
	$y$	$''$	$'''$	$^{\circ}$	$h\ m$	$^{\circ}$	$h\ m$			$''$		
May	17	0.3775	+31.02	+2.068	346 54	23 7.6	210 34	14 2.3	+1.1413	+1.3002	-4.40	-0.6439
	18	0.3802	31.13	2.075	347 11	23 8.7	209 38	13 58.6	1.1422	1.3008	4.29	0.6324
	19	0.3830	31.27	2.085	347 30	23 10.0	208 43	13 54.9	1.1436	1.3014	4.17	0.6204
	h 20	0.3857	31.45	2.097	347 48	23 11.2	207 48	13 51.2	1.1455	1.3019	4.05	0.6079
	(16.0) 21	0.3884	31.65	2.110	348 4	23 12.3	206 53	13 47.5	1.1480	1.3024	3.93	0.5948
	22	0.3912	+31.87	+2.125	348 16	23 13.1	205 58	13 43.9	+1.1507	+1.3029	-3.81	-0.5813
	23	0.3939	32.09	2.139	348 23	23 13.5	205 3	13 40.2	1.1535	1.3034	3.69	0.5673
	24	0.3967	32.29	2.153	348 26	23 13.7	204 9	13 36.6	1.1561	1.3039	3.57	0.5528
	25	0.3994	32.46	2.163	348 26	23 13.7	203 15	13 33.0	1.1584	1.3043	3.45	0.5377
	26	0.4021	32.60	2.173	348 24	23 13.6	202 21	13 29.4	1.1602	1.3048	3.33	0.5220
	27	0.4049	+32.71	+2.181	348 24	23 13.6	201 27	13 25.8	+1.1617	+1.3052	-3.20	-0.5054
	28	0.4076	32.79	2.186	348 26	23 13.7	200 33	13 22.2	1.1627	1.3056	3.08	0.4879
	29	0.4104	32.87	2.191	348 31	23 14.1	199 39	13 18.6	1.1635	1.3060	2.95	0.4695
	30	0.4131	32.95	2.197	348 41	23 14.7	198 45	13 15.0	1.1643	1.3064	2.82	0.4501
	31	0.4158	33.06	2.204	348 55	23 15.7	197 51	13 11.4	1.1655	1.3068	2.69	0.4298
	June	1	0.4186	+33.20	+2.213	349 10	23 16.7	196 57	13 7.8	+1.1670	+1.3071	-2.56
2		0.4213	33.38	2.225	349 28	23 17.9	196 3	13 4.2	1.1690	1.3075	2.43	0.3860
3		0.4241	33.60	2.240	349 43	23 18.9	195 10	13 0.7	1.1715	1.3078	2.30	0.3622
h 4		0.4268	33.87	2.258	349 56	23 19.7	194 17	12 57.1	1.1745	1.3081	2.17	0.3368
(17.0) 5		0.4295	34.12	2.275	350 4	23 20.3	193 24	12 53.6	1.1777	1.3084	2.04	0.3097
6		0.4323	+34.38	+2.292	350 8	23 20.5	192 31	12 50.1	+1.1808	+1.3087	-1.91	-0.2807
7		0.4350	34.60	2.307	350 8	23 20.5	191 38	12 46.5	1.1837	1.3089	1.78	0.2496
8		0.4378	34.79	2.319	350 6	23 20.4	190 45	12 43.0	1.1861	1.3092	1.65	0.2156
9		0.4405	34.94	2.329	350 3	23 20.2	189 52	12 39.5	1.1881	1.3094	1.51	0.1789
10		0.4432	35.06	2.337	350 2	23 20.1	188 59	12 35.9	1.1895	1.3096	1.38	0.1385
11		0.4460	+35.16	+2.344	350 3	23 20.2	188 6	12 32.4	+1.1907	+1.3098	-1.24	-0.0942
12		0.4487	35.24	2.349	350 8	23 20.5	187 13	12 28.9	1.1916	1.3099	1.11	0.0448
13		0.4515	35.33	2.355	350 17	23 21.1	186 21	12 25.4	1.1925	1.3101	0.97	9.9891
14		0.4542	35.44	2.363	350 28	23 21.9	185 29	12 21.9	1.1936	1.3102	0.84	9.9244
15		0.4569	35.58	2.372	350 42	23 22.8	184 36	12 18.4	1.1951	1.3103	0.70	9.8486
16		0.4597	+35.77	+2.385	350 55	23 23.7	183 44	12 14.9	+1.1971	+1.3104	-0.57	-9.7554
17		0.4624	35.99	2.399	351 7	23 24.5	182 51	12 11.4	1.1996	1.3105	0.43	9.6384
18		0.4652	36.22	2.415	351 15	23 25.0	181 59	12 7.9	1.2022	1.3105	0.30	9.4751
h 19		0.4679	36.46	2.431	351 19	23 25.3	181 6	12 4.4	1.2049	1.3106	0.16	9.2125
(18.0) 20		0.4706	36.68	2.445	351 19	23 25.3	180 13	12 0.9	1.2076	1.3106	-0.03	-8.4409
21		0.4733	+36.88	+2.459	351 16	23 25.1	179 21	11 57.4	+1.2100	+1.3106	+0.11	+9.0330
22		0.4761	37.04	2.469	351 11	23 24.7	178 28	11 53.9	1.2120	1.3106	0.24	9.3863
23		0.4788	37.16	2.477	351 7	23 24.5	177 36	11 50.4	1.2135	1.3105	0.38	9.5783
24		0.4815	37.25	2.483	351 4	23 24.3	176 43	11 46.9	1.2146	1.3105	0.51	9.7108
25		0.4842	37.34	2.489	351 4	23 24.3	175 50	11 43.4	1.2156	1.3104	0.64	9.8121
26		0.4870	+37.42	+2.495	351 8	23 24.5	174 58	11 39.9	+1.2165	+1.3103	+0.78	+9.8939
27		0.4897	37.53	2.502	351 16	23 25.1	174 5	11 36.3	1.2176	1.3102	0.91	9.9629
28		0.4925	37.66	2.511	351 26	23 25.7	173 13	11 32.9	1.2190	1.3101	1.05	0.0218
29		0.4952	37.85	2.523	351 38	23 26.5	172 20	11 29.3	1.2209	1.3099	1.18	0.0740
30		0.4979	38.08	2.539	351 48	23 27.2	171 27	11 25.8	1.2232	1.3097	1.32	0.1205
July	1	0.5007	+38.33	+2.555	351 56	23 27.7	170 35	11 22.3	+1.2259	+1.3095	+1.45	+0.1623
	2	0.5034	+38.59	+2.573	352 1	23 28.1	169 42	11 18.8	+1.2287	+1.3093	+1.59	+0.2006



## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)		$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .
			In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
July	1	0.5007	+38.33	+2.555	351 56	23 27.7	170 35	11 22.3	+1.2259	+1.3095	+1.45	+0.1623
	2	0.5034	38.59	2.573	352 1	23 28.1	169 42	11 18.8	1.2287	1.3093	1.59	0.2006
	3	0.5062	38.85	2.590	352 2	23 28.1	168 49	11 15.3	1.2316	1.3091	1.72	0.2354
	h 4	0.5089	39.09	2.606	351 59	23 27.9	167 56	11 11.7	1.2343	1.3088	1.85	0.2674
	(19.0) 5	0.5116	39.29	2.619	351 54	23 27.6	167 3	11 8.2	1.2367	1.3085	1.98	0.2973
	6	0.5144	+39.46	+2.631	351 48	23 27.2	166 10	11 4.7	+1.2386	+1.3082	+2.11	+0.3251
	7	0.5171	39.57	2.638	351 43	23 26.9	165 17	11 1.1	1.2400	1.3079	2.24	0.3512
	8	0.5199	39.67	2.645	351 40	23 26.7	164 24	10 57.6	1.2411	1.3076	2.37	0.3756
	9	0.5226	39.75	2.650	351 39	23 26.6	163 31	10 54.1	1.2419	1.3073	2.50	0.3988
	10	0.5253	39.82	2.655	351 43	23 26.9	162 38	10 50.5	1.2428	1.3070	2.63	0.4204
	11	0.5281	+39.92	+2.661	351 49	23 27.3	161 44	10 46.9	+1.2438	+1.3066	+2.76	+0.4410
	12	0.5308	40.05	2.670	351 58	23 27.9	160 51	10 43.4	1.2450	1.3062	2.89	0.4606
	13	0.5336	40.21	2.681	352 6	23 28.4	159 57	10 39.8	1.2465	1.3058	3.02	0.4792
	14	0.5363	40.40	2.693	352 13	23 28.9	159 3	10 36.2	1.2485	1.3054	3.14	0.4969
	15	0.5390	40.63	2.709	352 19	23 29.3	158 9	10 32.6	1.2508	1.3050	3.27	0.5138
	16	0.5418	+40.85	+2.723	352 20	23 29.3	157 15	10 29.0	+1.2532	+1.3046	+3.39	+0.5299
	17	0.5445	41.07	2.738	352 18	23 29.2	156 21	10 25.4	1.2555	1.3042	3.51	0.5453
	18	0.5473	41.26	2.751	352 13	23 28.9	155 27	10 21.8	1.2576	1.3037	3.63	0.5601
	19	0.5500	41.41	2.761	352 6	23 28.4	154 32	10 18.1	1.2593	1.3032	3.75	0.5743
	h 20	0.5527	41.54	2.769	351 59	23 27.9	153 38	10 14.5	1.2608	1.3027	3.87	0.5880
	(20.0) 21	0.5555	+41.62	+2.775	351 53	23 27.5	152 43	10 10.9	+1.2618	+1.3022	+3.99	+0.6012
	22	0.5582	41.68	2.779	351 49	23 27.3	151 49	10 7.3	1.2624	1.3017	4.11	0.6139
	23	0.5610	41.75	2.783	351 49	23 27.3	150 54	10 3.6	1.2631	1.3012	4.23	0.6261
	24	0.5637	41.82	2.788	351 52	23 27.5	149 59	9 59.9	1.2639	1.3006	4.34	0.6378
	25	0.5664	41.92	2.795	351 58	23 27.9	149 4	9 56.3	1.2648	1.3001	4.45	0.6491
	26	0.5692	+42.07	+2.805	352 6	23 28.4	148 9	9 52.6	+1.2661	+1.2995	+4.56	+0.6600
	27	0.5719	42.25	2.817	352 13	23 28.9	147 14	9 48.9	1.2679	1.2990	4.67	0.6705
	28	0.5747	42.46	2.831	352 19	23 29.3	146 18	9 45.2	1.2700	1.2984	4.78	0.6806
	29	0.5774	42.70	2.847	352 22	23 29.5	145 22	9 41.5	1.2723	1.2978	4.89	0.6903
	30	0.5801	42.93	2.862	352 21	23 29.4	144 26	9 37.7	1.2748	1.2972	5.00	0.6998
Aug.	31	0.5829	+43.15	+2.877	352 18	23 29.2	143 30	9 34.0	+1.2770	+1.2966	+5.11	+0.7089
	1	0.5856	43.34	2.889	352 11	23 28.7	142 34	9 30.3	1.2790	1.2960	5.22	0.7177
	2	0.5884	43.48	2.899	352 4	23 28.3	141 38	9 26.5	1.2806	1.2954	5.32	0.7262
	3	0.5911	43.60	2.907	351 57	23 27.8	140 41	9 22.7	1.2819	1.2948	5.42	0.7344
	h 4	0.5938	43.67	2.911	351 51	23 27.4	139 45	9 19.0	1.2827	1.2942	5.52	0.7423
	(21.0) 5	0.5966	+43.72	+2.915	351 48	23 27.2	138 48	9 15.3	+1.2833	+1.2936	+5.62	+0.7500
	6	0.5993	43.77	2.918	351 49	23 27.3	137 51	9 11.4	1.2837	1.2930	5.72	0.7575
	7	0.6021	43.83	2.922	351 52	23 27.5	136 54	9 7.6	1.2843	1.2924	5.82	0.7648
	8	0.6048	43.92	2.929	351 58	23 27.9	135 57	9 3.8	1.2851	1.2917	5.91	0.7719
	9	0.6075	44.04	2.936	352 6	23 28.4	134 59	8 59.9	1.2861	1.2911	6.00	0.7787
	10	0.6102	+44.20	+2.947	352 11	23 28.7	134 1	8 56.1	+1.2876	+1.2904	+6.09	+0.7852
	11	0.6130	44.38	2.959	352 15	23 29.0	133 3	8 52.2	1.2893	1.2898	6.18	0.7915
	12	0.6157	44.57	2.971	352 16	23 29.1	132 5	8 48.3	1.2912	1.2891	6.27	0.7976
	13	0.6184	44.76	2.984	352 14	23 28.9	131 6	8 44.4	1.2930	1.2885	6.36	0.8035
	14	0.6211	44.92	2.995	352 9	23 28.6	130 7	8 40.5	1.2947	1.2879	6.44	0.8094
	15	0.6239	+45.06	+3.004	352 3	23 28.2	129 7	8 36.5	+1.2961	+1.2872	+6.52	+0.8151
	16	0.6266	+45.15	+3.010	351 54	23 27.6	128 8	8 32.5	+1.2972	+1.2866	+6.60	+0.8204

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .	
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.					
	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$			$^{\circ}$		
Aug.	16	0.6266	+45.15	+3.010	351 54	23 27.6	128 8	8 32.5	+1.2972	+1.2866	+6.60	+0.8204
	17	0.6294	45.22	3.015	351 48	23 27.2	127 8	8 28.5	1.2979	1.2860	6.68	0.8254
	18	0.6321	45.25	3.017	351 44	23 26.9	126 9	8 24.6	1.2983	1.2854	6.76	0.8302
	19	0.6348	45.28	3.019	351 42	23 26.8	125 9	8 20.6	1.2986	1.2848	6.83	0.8349
h (22.0)	20	0.6376	45.31	3.021	351 44	23 26.9	124 9	8 16.6	1.2989	1.2842	6.90	0.8395
	21	0.6403	+45.37	+3.025	351 48	23 27.2	123 9	8 12.6	+1.2994	+1.2836	+6.98	+0.8440
	22	0.6431	45.46	3.031	351 54	23 27.6	122 9	8 8.6	1.3001	1.2830	7.05	0.8484
	23	0.6458	45.60	3.040	352 1	23 28.1	121 9	8 4.6	1.3013	1.2825	7.12	0.8526
	24	0.6485	45.77	3.051	352 7	23 28.5	120 8	8 0.5	1.3028	1.2819	7.18	0.8566
	25	0.6513	45.97	3.065	352 11	23 28.7	119 7	7 56.5	1.3046	1.2814	7.25	0.8604
	26	0.6540	+46.17	+3.078	352 12	23 28.8	118 6	7 52.4	+1.3065	+1.2809	+7.31	+0.8641
	27	0.6568	46.36	3.091	352 9	23 28.6	117 5	7 48.3	1.3084	1.2804	7.37	0.8676
	28	0.6595	46.53	3.102	352 5	23 28.3	116 4	7 44.3	1.3101	1.2799	7.43	0.8709
	29	0.6622	46.66	3.111	351 59	23 27.9	115 3	7 40.2	1.3114	1.2794	7.48	0.8741
	30	0.6650	46.75	3.117	351 52	23 27.5	114 1	7 36.1	1.3123	1.2789	7.53	0.8772
	31	0.6677	+46.80	+3.120	351 47	23 27.1	112 59	7 31.9	+1.3129	+1.2784	+7.58	+0.8801
Sept.	1	0.6705	46.82	3.121	351 44	23 26.9	111 57	7 27.8	1.3132	1.2780	7.63	0.8829
	2	0.6732	46.84	3.123	351 45	23 27.0	110 55	7 23.7	1.3133	1.2776	7.68	0.8856
h (23.0)	3	0.6759	46.86	3.124	351 48	23 27.2	109 53	7 19.5	1.3135	1.2772	7.72	0.8881
	4	0.6787	46.91	3.127	351 54	23 27.6	108 51	7 15.4	1.3138	1.2768	7.76	0.8904
	5	0.6814	+47.00	+3.133	352 1	23 28.1	107 49	7 11.3	+1.3144	+1.2764	+7.80	+0.8926
	6	0.6842	47.12	3.141	352 8	23 28.5	106 46	7 7.1	1.3154	1.2760	7.84	0.8947
	7	0.6869	47.26	3.151	352 14	23 28.9	105 43	7 2.9	1.3166	1.2757	7.88	0.8967
	8	0.6896	47.42	3.161	352 17	23 29.1	104 40	6 58.7	1.3180	1.2754	7.91	0.8986
	9	0.6924	47.58	3.172	352 18	23 29.2	103 37	6 54.5	1.3195	1.2751	7.94	0.9003
	10	0.6951	+47.73	+3.182	352 15	23 29.0	102 34	6 50.3	+1.3210	+1.2748	+7.97	+0.9019
	11	0.6979	47.85	3.190	352 11	23 28.7	101 31	6 46.1	1.3222	1.2745	8.00	0.9033
	12	0.7006	47.93	3.195	352 5	23 28.3	100 28	6 41.9	1.3230	1.2743	8.03	0.9046
	13	0.7033	47.97	3.198	352 0	23 28.0	99 25	6 37.7	1.3235	1.2741	8.05	0.9058
	14	0.7061	48.00	3.200	351 57	23 27.8	98 21	6 33.4	1.3237	1.2739	8.07	0.9068
	15	0.7088	+48.00	+3.200	351 56	23 27.7	97 17	6 29.1	+1.3237	+1.2737	+8.09	+0.9077
	16	0.7116	48.01	3.201	351 59	23 27.9	96 13	6 24.9	1.3238	1.2735	8.10	0.9085
	17	0.7143	48.03	3.202	352 3	23 28.2	95 9	6 20.6	1.3239	1.2734	8.11	0.9092
	18	0.7170	48.10	3.207	352 11	23 28.7	94 6	6 16.4	1.3244	1.2733	8.12	0.9098
h (0.0)	19	0.7198	48.20	3.213	352 20	23 29.3	93 2	6 12.1	1.3251	1.2733	8.13	0.9102
	20	0.7225	+48.35	+3.223	352 28	23 29.9	91 58	6 7.9	+1.3263	+1.2732	+8.13	+0.9105
	21	0.7253	48.51	3.234	352 34	23 30.3	90 54	6 3.6	1.3277	1.2732	8.14	0.9106
	22	0.7280	48.70	3.247	352 38	23 30.5	89 50	5 59.3	1.3293	1.2731	8.14	0.9106
	23	0.7307	48.90	3.260	352 39	23 30.6	88 46	5 55.1	1.3310	1.2731	8.14	0.9105
	24	0.7334	49.05	3.270	352 38	23 30.5	87 42	5 50.7	1.3324	1.2732	8.13	0.9103
	25	0.7362	+49.19	+3.279	352 34	23 30.3	86 38	5 46.5	+1.3336	+1.2733	+8.13	+0.9100
	26	0.7389	49.27	3.285	352 30	23 30.0	85 34	5 42.3	1.3345	1.2734	8.12	0.9096
	27	0.7416	49.32	3.288	352 27	23 29.8	84 29	5 37.9	1.3350	1.2735	8.11	0.9090
	28	0.7443	49.35	3.290	352 26	23 29.7	83 25	5 33.7	1.3352	1.2736	8.09	0.9083
	29	0.7471	49.36	3.291	352 28	23 29.9	82 21	5 29.4	1.3353	1.2738	8.08	0.9075
	30	0.7498	+49.37	+3.291	352 33	23 30.2	81 16	5 25.1	+1.3353	+1.2740	+8.06	+0.9065
Oct.	1	0.7526	+49.39	+3.293	352 40	23 30.7	80 12	5 20.8	+1.3355	+1.2742	+8.04	+0.9054

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)		$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .
			In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.				
Oct.	$y$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$	$^{\circ}$				
	1	0.7526	+49.39	+3.293	352 40	23 30.7	80 12	5 20.8	+1.3355	+1.2742	+8.04	+0.9054
	2	0.7553	49.47	3.298	352 49	23 31.3	79 8	5 16.5	1.3359	1.2744	8.02	0.9041
	3	0.7580	49.58	3.305	352 59	23 31.9	78 4	5 12.3	1.3367	1.2747	7.99	0.9027
	h	0.7608	49.71	3.314	353 7	23 32.5	77 0	5 8.0	1.3377	1.2749	7.96	0.9011
	(1.0)	0.7635	49.87	3.325	353 14	23 32.9	75 56	5 3.7	1.3390	1.2752	7.93	0.8994
	6	0.7663	+50.03	+3.335	353 18	23 33.2	74 52	4 59.5	+1.3404	+1.2755	+7.90	+0.8976
	7	0.7690	50.19	3.346	353 19	23 33.3	73 48	4 55.2	1.3418	1.2758	7.86	0.8956
	8	0.7717	50.31	3.354	353 17	23 33.1	72 44	4 50.9	1.3429	1.2762	7.82	0.8935
	9	0.7745	50.41	3.361	353 15	23 33.0	71 40	4 46.7	1.3437	1.2766	7.78	0.8913
	10	0.7772	50.49	3.366	353 12	23 32.8	70 36	4 42.4	1.3444	1.2770	7.74	0.8890
	11	0.7800	+50.52	+3.368	353 11	23 32.7	69 32	4 38.1	+1.3447	+1.2774	+7.70	+0.8866
	12	0.7827	50.53	3.369	353 12	23 32.8	68 29	4 33.9	1.3448	1.2778	7.65	0.8840
	13	0.7854	50.54	3.369	353 16	23 33.1	67 25	4 29.7	1.3448	1.2782	7.60	0.8813
	14	0.7882	50.57	3.371	353 23	23 33.5	66 22	4 25.5	1.3449	1.2787	7.55	0.8784
	15	0.7909	50.63	3.375	353 32	23 34.1	65 18	4 21.2	1.3454	1.2792	7.50	0.8753
	16	0.7937	+50.73	+3.382	353 43	23 34.9	64 14	4 16.9	+1.3460	+1.2797	+7.45	+0.8720
	17	0.7964	50.88	3.392	353 53	23 35.5	63 11	4 12.7	1.3472	1.2802	7.39	0.8686
	18	0.7991	51.05	3.403	354 2	23 36.1	62 8	4 8.5	1.3486	1.2807	7.33	0.8650
	h	0.8019	51.26	3.417	354 9	23 36.6	61 6	4 4.4	1.3502	1.2813	7.27	0.8613
	(2.0)	0.8046	51.45	3.430	354 12	23 36.8	60 4	4 0.3	1.3518	1.2818	7.20	0.8574
	21	0.8074	+51.64	+3.443	354 14	23 36.9	59 2	3 56.1	+1.3534	+1.2824	+7.13	+0.8533
	22	0.8101	51.81	3.454	354 13	23 36.9	58 0	3 52.0	1.3548	1.2830	7.06	0.8490
	23	0.8128	51.93	3.462	354 12	23 36.8	56 57	3 47.8	1.3558	1.2836	6.99	0.8446
	24	0.8156	52.03	3.469	354 11	23 36.7	55 55	3 43.7	1.3566	1.2842	6.92	0.8400
	25	0.8183	52.07	3.471	354 10	23 36.7	54 53	3 39.5	1.3571	1.2848	6.84	0.8352
	26	0.8211	+52.11	+3.474	354 14	23 36.9	53 51	3 35.4	+1.3573	+1.2854	+6.76	+0.8302
	27	0.8238	52.15	3.477	354 20	23 37.3	52 49	3 31.3	1.3575	1.2861	6.68	0.8250
	28	0.8265	52.19	3.479	354 28	23 37.9	51 48	3 27.2	1.3578	1.2867	6.60	0.8196
	29	0.8293	52.27	3.485	354 38	23 38.5	50 47	3 23.1	1.3583	1.2873	6.51	0.8140
	30	0.8320	52.40	3.493	354 49	23 39.3	49 46	3 19.1	1.3593	1.2879	6.43	0.8082
31	0.8348	+52.55	+3.503	354 59	23 39.9	48 45	3 15.0	+1.3605	+1.2885	+6.34	+0.8022	
Nov.	1	0.8375	52.74	3.516	355 8	23 40.5	47 44	3 10.9	1.3619	1.2892	6.25	0.7961
	2	0.8402	52.93	3.529	355 14	23 40.9	46 43	3 6.9	1.3634	1.2899	6.16	0.7897
	h	0.8430	53.13	3.542	355 17	23 41.1	45 43	3 2.9	1.3650	1.2905	6.06	0.7831
	(3.0)	0.8457	53.29	3.553	355 17	23 41.1	44 42	2 58.8	1.3664	1.2912	5.97	0.7762
	5	0.8485	+53.43	+3.562	355 16	23 41.1	43 42	2 54.8	+1.3675	+1.2919	+5.87	+0.7690
	6	0.8512	53.56	3.571	355 15	23 41.0	42 42	2 50.8	1.3684	1.2926	5.77	0.7615
	7	0.8539	53.62	3.575	355 15	23 41.0	41 42	2 46.8	1.3690	1.2932	5.67	0.7537
	8	0.8567	53.67	3.578	355 16	23 41.1	40 42	2 42.8	1.3694	1.2939	5.57	0.7456
	9	0.8594	53.71	3.581	355 21	23 41.4	39 43	2 38.9	1.3697	1.2945	5.46	0.7373
	10	0.8622	+53.76	+3.584	355 27	23 41.8	38 43	2 34.9	+1.3701	+1.2952	+5.36	+0.7287
	11	0.8649	53.85	3.590	355 36	23 42.4	37 43	2 30.9	1.3707	1.2958	5.25	0.7198
	12	0.8676	53.97	3.598	355 46	23 43.1	36 44	2 26.9	1.3716	1.2965	5.14	0.7107
	13	0.8703	54.14	3.609	355 57	23 43.8	35 45	2 23.0	1.3728	1.2971	5.03	0.7012
	14	0.8731	54.36	3.624	356 6	23 44.4	34 46	2 19.1	1.3744	1.2977	4.91	0.6913
	15	0.8758	+54.58	+3.639	356 13	23 44.9	33 47	2 15.1	+1.3762	+1.2983	+4.80	+0.6810
	16	0.8785	+54.81	+3.654	356 18	23 45.2	32 48	2 11.2	+1.3780	+1.2989	+4.68	+0.6702

## FOR WASHINGTON MEAN MIDNIGHT.

Solar Day. (Sid. Hour.)	$\tau$	$f$		$G$		$H$		Log $g$ .	Log $h$ .	$i$	Log $i$ .	
		In Arc.	In Time.	In Arc.	In Time.	In Arc.	In Time.					
Nov.	y	"	s	"	'	"	'	"	"	"	"	
	16	0.8785	+54.81	+3.654	356 18	23 45.2	32 48	2 11.2	+1.3780	+1.2989	+4.68	+0.6702
	17	0.8812	55.05	3.670	356 20	23 45.3	31 49	2 7.3	1.3799	1.2995	4.56	0.6590
	h 18	0.8840	55.27	3.685	356 20	23 45.3	30 51	2 3.4	1.3816	1.3001	4.44	0.6474
	(4.0) 19	0.8867	55.44	3.696	356 19	23 45.3	29 53	1 59.5	1.3829	1.3007	4.32	0.6354
	20	0.8895	55.57	3.705	356 17	23 45.1	28 55	1 55.7	1.3840	1.3013	4.20	0.6230
	21	0.8922	+55.68	+3.712	356 17	23 45.1	27 57	1 51.8	+1.3848	+1.3018	+4.08	+0.6102
	22	0.8949	55.76	3.717	356 19	23 45.3	26 59	1 47.9	1.3854	1.3024	3.96	0.5969
	23	0.8977	55.83	3.722	356 24	23 45.6	26 1	1 44.1	1.3860	1.3029	3.83	0.5829
	24	0.9004	55.91	3.727	356 30	23 46.0	25 3	1 40.2	1.3865	1.3034	3.70	0.5681
	25	0.9032	56.03	3.735	356 39	23 46.6	24 5	1 36.3	1.3873	1.3039	3.57	0.5526
	26	0.9059	+56.16	+3.744	356 49	23 47.3	23 8	1 32.5	+1.3884	+1.3044	+3.44	+0.5364
	27	0.9086	56.35	3.757	356 58	23 47.9	22 11	1 28.7	1.3897	1.3049	3.31	0.5195
	28	0.9114	56.55	3.770	357 5	23 48.3	21 14	1 24.9	1.3913	1.3053	3.18	0.5017
	29	0.9141	56.79	3.786	357 10	23 48.7	20 17	1 21.1	1.3930	1.3058	3.04	0.4830
30	0.9169	57.03	3.802	357 13	23 48.9	19 20	1 17.3	1.3948	1.3062	2.91	0.4634	
Dec.	1	0.9196	+57.24	+3.816	357 13	23 48.9	18 23	1 13.5	+1.3964	+1.3066	+2.77	+0.4428
	2	0.9223	57.42	3.828	357 12	23 48.8	17 26	1 9.7	1.3978	1.3070	2.64	0.4210
	3	0.9251	57.58	3.839	357 10	23 48.7	16 29	1 5.9	1.3990	1.3073	2.50	0.3978
	h 4	0.9278	57.70	3.847	357 8	23 48.5	15 32	1 2.1	1.4000	1.3077	2.36	0.3732
	(5.0) 5	0.9306	57.78	3.852	357 7	23 48.5	14 35	0 58.3	1.4006	1.3080	2.22	0.3468
	6	0.9333	+57.86	+3.857	357 9	23 48.6	13 39	0 54.6	+1.4011	+1.3083	+2.08	+0.3187
	7	0.9360	57.94	3.863	357 13	23 48.9	12 42	0 50.8	1.4017	1.3086	1.94	0.2886
	8	0.9388	58.04	3.869	357 19	23 49.3	11 46	0 47.1	1.4025	1.3088	1.80	0.2558
	9	0.9415	58.18	3.879	357 27	23 49.8	10 49	0 43.3	1.4034	1.3091	1.66	0.2203
	10	0.9443	58.36	3.891	357 35	23 50.3	9 53	0 39.5	1.4048	1.3094	1.52	0.1817
	11	0.9470	+58.60	+3.907	357 42	23 50.8	8 57	0 35.8	+1.4065	+1.3096	+1.38	+0.1389
	12	0.9497	58.84	3.923	357 47	23 51.1	8 0	0 32.0	1.4082	1.3098	1.24	0.0914
	13	0.9525	59.11	3.941	357 51	23 51.4	7 4	0 28.3	1.4102	1.3100	1.09	0.0385
	14	0.9552	59.38	3.959	357 51	23 51.4	6 8	0 24.5	1.4121	1.3101	0.95	9.9773
	15	0.9580	59.62	3.975	357 49	23 51.3	5 12	0 20.8	1.4139	1.3103	0.80	9.9063
	16	0.9607	+59.83	+3.989	357 46	23 51.1	4 16	0 17.1	+1.4155	+1.3104	+0.66	+9.8207
	17	0.9634	60.00	4.000	357 43	23 50.9	3 20	0 13.3	1.4167	1.3105	0.52	9.7135
	18	0.9662	60.14	4.009	357 40	23 50.7	2 24	0 9.6	1.4178	1.3105	0.37	9.5720
	h 19	0.9689	60.25	4.017	357 39	23 50.6	1 28	0 5.9	1.4186	1.3106	0.23	9.3592
	(6.0) 20	0.9717	60.34	4.023	357 41	23 50.7	0 32	0 2.1	1.4192	1.3106	+0.08	+8.9248
21	0.9744	+60.43	+4.029	357 44	23 50.9	359 36	23 58.4	+1.4198	+1.3106	-0.06	-8.7832	
22	0.9771	60.55	4.037	357 50	23 51.3	358 40	23 54.7	1.4207	1.3106	0.20	9.3126	
23	0.9799	60.69	4.046	357 56	23 51.7	357 44	23 50.9	1.4217	1.3105	0.35	9.5442	
24	0.9826	60.87	4.058	358 2	23 52.1	356 48	23 47.2	1.4230	1.3105	0.49	9.6943	
25	0.9854	61.11	4.074	358 7	23 52.5	355 51	23 43.4	1.4245	1.3104	0.64	9.8052	
26	0.9881	+61.35	+4.090	358 10	23 52.7	354 55	23 39.7	+1.4262	+1.3103	-0.78	-9.8939	
27	0.9908	61.58	4.105	358 11	23 52.7	353 59	23 35.9	1.4279	1.3102	0.92	9.9671	
28	0.9936	61.81	4.121	358 10	23 52.7	353 3	23 32.2	1.4295	1.3100	1.07	0.0297	
29	0.9963	62.02	4.135	358 6	23 52.4	352 7	23 28.5	1.4310	1.3098	1.21	0.0841	
30	0.9991	62.20	4.147	358 2	23 52.1	351 11	23 24.7	1.4323	1.3096	1.36	0.1322	
31	1.0018	+62.32	+4.155	357 57	23 51.8	350 14	23 20.9	+1.4332	+1.3094	-1.50	-0.1756	
32	1.0045	+62.42	+4.161	357 54	23 51.5	349 18	23 17.2	+1.4339	+1.3092	-1.64	-0.2152	

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Name of Star.	Magni- tude.	Right Ascension.	Annual Variation	Declination.	Annual Variation.
		h m s	s	° ' "	"
<i>a</i> Andromedæ . . .	2.1	0 3 6.853	+ 3.0930	+ 28 31 38.15	+19.884
* <i>β</i> Cassiopeia . . .	2.4	0 3 44.008	3.1787	+ 58 35 12.62	19.850
* 22 Andromedæ . . .	4.9	0 5 1.110	3.1051	+ 45 30 15.97	20.034
4 Draconis (H.) . S. P.	5.1	0 7 25.833	2.8754	+101 49 1.19	20.020
<i>γ</i> Pegasi ( <i>Algenib.</i> ) .	2.8	0 7 58.961	3.0846	+ 14 36 59.23	20.022
* <i>σ</i> Andromedæ . . .	4.4	0 12 59.912	+ 3.1251	+ 36 13 10.79	+19.980
* <i>ι</i> Ceti . . .	3.6	0 14 13.650	3.0526	- 9 23 22.86	19.954
* 6 Ursæ Minoris . S. P.	6.2	0 14 21.998	0.2410	+ 91 44 4.09	19.939
* 44 Piscium . . .	5.8	0 20 10.396	3.0734	+ 1 22 29.29	19.950
<i>β</i> Hydri . . .	2.8	0 20 23.340	3.2184	- 77 49 43.54	20.280
12 Ceti . . .	6.0	0 24 49.978	+ 3.0611	- 4 31 14.98	+19.933
<i>κ</i> Draconis . . . S. P.	3.8	0 29 7.940	2.5873	+109 38 58.66	19.885
* <i>π</i> Andromedæ . . .	4.4	0 31 25.870	3.1927	+ 33 9 28.10	19.865
<i>a</i> Cassiopeia ( <i>var.</i> ) .	2.3	0 34 43.061	3.3786	+ 55 58 40.31	19.782
<i>β</i> Ceti . . .	2.2	0 38 28.204	3.0138	- 18 32 47.73	19.795
21 Cassiopeia . . .	5.7	0 38 54.141	+ 3.8716	+ 74 25 50.05	+19.743
* <i>ο</i> Cassiopeia . . .	4.7	0 39 2.313	3.3227	+ 47 43 33.74	19.747
* <i>δ</i> Piscium . . .	4.8	0 43 23.351	3.1080	+ 7 1 47.80	19.645
32 <sup>3</sup> Camelop. (H.) . S. P.	5.2	0 48 22.678	0.4108	+ 96 1 58.00	19.594
* <i>γ</i> Cassiopeia . . .	2.3	0 50 32.938	3.5851	+ 60 9 51.42	19.553
* <i>μ</i> Andromedæ . . .	4.0	0 51 5.356	+ 3.3137	+ 37 56 46.39	+19.608
* 43 Cephei (H.) . . .	4.6	0 54 46.580	7.3529	+ 85 42 35.96	19.483
<i>ε</i> Piscium . . .	4.3	0 57 38.914	3.1098	+ 7 20 27.47	19.445
<i>β</i> Andromedæ . . .	2.2	1 4 1.190	3.3468	+ 35 4 46.98	19.153
* <i>κ</i> Tucanæ . . .	4.9	1 12 18.846	2.0536	- 69 25 3.82	19.162
* <i>f</i> Piscium . . .	5.1	1 12 32.182	+ 3.0903	+ 3 4 38.35	+19.026
<i>θ</i> <sup>1</sup> Ceti . . .	3.6	1 18 55.466	2.9972	- 8 42 34.86	18.655
<i>a</i> Ursæ Minoris ( <i>Polaris</i> )	2.2	1 21 43.699	24.8320	+ 88 45 49.11	18.790
38 Cassiopeia . . .	5.9	1 23 38.003	4.3902	+ 69 44 22.60	18.656
* <i>κ</i> Octantis . . . S. P.	5.4	1 24 26.146	8.8756	- 94 44 12.57	18.710
<i>η</i> Piscium . . .	3.7	1 26 1.450	+ 3.2038	+ 14 49 12.04	+18.649
* <i>υ</i> Andromedæ . . .	4.2	1 30 48.573	3.5074	+ 40 53 43.66	18.129
* <i>π</i> Piscium . . .	5.5	1 31 41.438	3.1752	+ 11 37 11.82	18.517
<i>a</i> Eridani ( <i>Achernar</i> ) .	0.4	1 33 54.549	2.2312	- 57 45 18.01	18.345
* <i>ν</i> Piscium . . .	4.6	1 36 7.354	3.1186	+ 4 58 17.17	18.313
<i>ο</i> Piscium . . .	4.4	1 40 0.398	+ 3.1632	+ 8 38 38.94	+18.200
* <i>ζ</i> Ceti . . .	3.6	1 46 25.542	2.9620	- 10 50 24.42	17.805
<i>β</i> Arietis . . .	2.8	1 49 0.223	3.3051	+ 20 18 33.84	17.709
50 Cassiopeia . . .	4.1	1 54 43.000	5.0273	+ 71 55 39.95	17.616
* <i>γ</i> Andromedæ . . .	2.2	1 57 38.145	3.6637	+ 41 50 24.85	17.420
<i>a</i> Arietis . . .	2.1	2 1 25.323	+ 3.3727	+ 22 58 48.33	+17.151
<i>a</i> Draconis . . . S. P.	3.7	2 1 37.722	1.6242	+115 8 12.64	17.289
* <i>β</i> Trianguli . . .	3.1	2 3 28.378	3.5572	+ 34 30 17.39	17.182
<i>ξ</i> <sup>1</sup> Ceti . . .	4.5	2 7 35.584	+ 3.1751	+ 8 22 5.41	17.009
* 4 Ursæ Minoris . S. P.	4.9	2 9 14.497	- 0.3095	+101 58 23.19	16.903
* <i>γ</i> Trianguli . . .	4.3	2 11 14.925	+ 3.5534	+ 33 22 31.85	+16.821
* 67 Ceti . . .	5.6	2 11 53.686	2.9898	- 6 53 32.39	16.712
* <i>δ</i> Hydri . . .	4.2	2 19 56.064	1.0572	- 69 7 24.38	16.442
<i>ι</i> Cassiopeia . . .	4.6	2 20 39.096	4.8734	+ 66 56 37.51	16.397
<i>ξ</i> <sup>2</sup> Ceti . . .	4.5	2 22 44.113	+ 3.1847	+ 8 0 10.00	+16.271

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

MEAN PLACES FOR 1898.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.382, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ' "	"
5 Ursæ Minoris . S. P.	4.5	2 27 44.320	- 0.1801	+103 51 2.25	+16.012
* $\mu$ Hydri . . . .	5.3	2 33 49.153	- 1.4130	- 79 33 14.75	15.692
* $\delta$ Ceti . . . .	4.1	2 34 15.254	+ 3.0735	- 0 6 42.17	15.673
* $\theta$ Persei . . . .	4.2	2 37 13.846	4.0742	+ 48 47 48.95	15.426
$\gamma$ Ceti . . . .	3.6	2 38 08.55	3.1041	+ 2 48 21.17	15.314
* $\sigma$ Arietis . . . .	5.5	2 45 51.601	+ 3.3058	+ 14 39 41.93	+14.986
$\beta$ Ursæ Minoris . S. P.	2.2	2 51 0.015	- 0.2223	+105 25 39.71	14.721
* 47 Cephei (H.) . .	5.7	2 52 30.770	+ 7.7608	+ 79 0 55.48	14.631
* $\epsilon$ Arietis . . . .	4.6	2 53 22.704	3.4226	+ 20 55 56.86	14.581
$\alpha$ Ceti . . . .	2.6	2 56 56.786	3.1312	+ 3 41 22.20	14.282
* $\beta$ Persei ( <i>Algol</i> ) ( <i>var.</i> ) .	2.3	3 1 31.776	+ 3.8867	+ 40 33 45.13	+14.086
48 Cephei (H.) . .	5.5	3 7 22.083	7.4373	+ 77 21 35.54	13.663
$\zeta$ Arietis . . . .	4.8	3 9 2.235	3.4408	+ 20 39 58.92	13.525
$\alpha$ Persei . . . .	1.9	3 17 2.338	+ 4.2617	+ 49 29 52.91	13.053
* $\epsilon$ Hydri . . . .	5.7	3 18 29.954	- 1.5815	- 77 45 39.15	13.040
* $\rho$ Octantis . . S. P.	5.7	3 19 45.205	+13.0968	- 95 52 29.54	+12.864
$\gamma$ Ursæ Minoris . S. P.	3.2	3 20 53.369	- 0.1273	+107 48 11.03	12.812
* $f$ Tauri . . . .	4.3	3 25 14.410	+ 3.3061	+ 12 35 13.81	12.537
$\epsilon$ Eridani . . . .	3.7	3 28 7.451	2.8241	- 9 48 11.97	12.366
$\delta$ Persei . . . .	3.1	3 35 39.666	4.2535	+ 47 27 40.47	11.767
* $\gamma$ Camelopardalis (H.) .	4.6	3 39 35.086	+ 6.2521	+ 71 1 4.11	+11.482
$\eta$ Tauri . . . .	3.1	3 41 25.171	+ 3.5584	+ 23 47 22.55	11.344
$\zeta$ Ursæ Minoris . S. P.	4.6	3 47 42.003	- 2.2342	+101 53 30.24	10.944
$\zeta$ Persei . . . .	3.0	3 47 43.144	+ 3.7621	+ 31 34 49.73	10.910
* $\gamma$ Hydri . . . .	3.3	3 48 48.821	- 0.9874	- 74 33 5.35	10.992
* $\epsilon$ Persei . . . .	3.0	3 51 0.381	+ 4.0124	+ 39 42 54.15	+10.681
$\gamma$ Eridani . . . .	3.0	3 53 16.260	2.7989	- 13 47 55.51	10.416
* A <sup>1</sup> Tauri . . . .	4.6	3 58 39.861	3.5412	+ 21 48 10.40	10.046
* $c$ Persei . . . .	4.3	4 1 15.280	4.3402	+ 47 26 24.08	9.894
Groombr. 2320 . S. P.	5.5	4 6 2.316	0.1432	+111 55 15.84	9.496
* o <sup>1</sup> Eridani . . . .	4.2	4 6 53.168	+ 2.9273	- 7 6 13.20	+ 9.585
$\gamma$ Tauri . . . .	3.8	4 13 59.285	+ 3.4099	+ 15 22 52.59	8.921
* $\eta$ Ursæ Minoris . S. P.	5.0	4 20 28.983	- 1.8066	+104 0 34.41	8.182
$\eta$ Draconis . . S. P.	2.8	4 22 36.712	+ 0.8079	+118 15 18.06	8.212
$\epsilon$ Tauri . . . .	3.6	4 22 39.573	+ 3.4985	+ 18 57 14.70	8.219
* $\delta$ Mensæ . . . .	5.6	4 24 52.239	- 4.2001	- 80 27 12.70	+ 8.093
* $m$ Persei . . . .	6.0	4 26 14.238	+ 4.2123	+ 42 50 44.66	7.958
A Draconis . . S. P.	5.0	4 28 11.111	- 0.1315	+111 0 41.06	7.799
$\alpha$ Tauri ( <i>Aldebaran</i> ) .	1.0	4 30 4.016	+ 3.4383	+ 16 18 14.98	7.477
* $\tau$ Tauri . . . .	4.5	4 36 7.325	3.5964	+ 22 45 40.01	7.150
$\alpha$ Camelopardalis . .	4.4	4 43 54.241	+ 5.9308	+ 66 10 9.20	+ 6.535
* $i$ Tauri . . . .	5.2	4 45 24.393	3.5062	+ 18 39 57.83	6.366
$\epsilon$ Aurigæ . . . .	2.8	4 50 21.026	3.9019	+ 33 0 16.25	5.980
* $\zeta$ Aurigæ . . . .	3.9	4 55 20.830	+ 4.1866	+ 40 55 36.86	5.576
$\epsilon$ Ursæ Minoris . S. P.	4.5	4 56 25.071	- 6.3048	+ 97 47 41.54	5.494
11 Orionis . . . .	4.7	4 58 44.376	+ 3.4250	+ 15 15 42.90	+ 5.258
* $\beta$ Eridani . . . .	2.9	5 2 50.104	2.9489	- 5 13 5.79	4.892
$\alpha$ Aurigæ ( <i>Capella</i> ) .	0.1	5 9 9.193	4.4261	+ 45 53 38.72	3.977
$\beta$ Orionis ( <i>Rigel</i> ) . .	0.3	5 9 38.130	2.8816	- 8 19 10.47	4.365
* $\tau$ Orionis . . . .	3.8	5 12 39.209	+ 2.9136	- 6 57 17.48	+ 4.102

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Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ' "	"
$\beta$ Tauri . . . .	1.8	5 19 50.612	+ 3.7900	+ 28 31 16.18	+ 3.315
* $\chi$ Aurigæ . . . .	5.0	5 26 5.421	3.9056	+ 32 7 0.71	2.975
Groombridge 966 . . . .	6.4	5 26 5.588	8.0068	+ 74 58 33.88	2.975
$\delta$ Orionis ( <i>var.</i> ) . . . .	2.3	5 26 47.718	3.0637	- 0 22 29.06	2.890
$\alpha$ Leporis . . . .	2.7	5 28 13.877	2.6450	- 17 53 43.33	2.770
* Groombridge 944 . . . .	6.4	5 29 17.785	+18.7043	+ 85 8 44.93	+ 2.692
$\epsilon$ Orionis . . . .	1.8	5 31 2.233	3.0427	- 1 16 1.63	2.528
$\alpha$ Columbæ . . . .	2.7	5 35 57.395	+ 2.1730	- 34 7 43.13	2.055
$\omega$ Draconis . . . S. P.	4.9	5 37 32.976	- 0.3529	+111 11 41.78	1.637
* $\kappa$ Orionis . . . .	2.3	5 42 55.100	+ 2.8451	- 9 42 21.35	1.496
$\psi^1$ Draconis . . . S. P.	4.8	5 43 45.052	- 1.0774	+107 48 4.30	+ 1.693
* $\nu$ Aurigæ . . . .	4.1	5 44 25.155	+ 4.1548	+ 39 7 6.86	1.398
* $\delta$ Doradus . . . .	4.4	5 44 35.595	0.1054	- 65 46 25.59	1.326
$\alpha$ Orionis ( <i>var.</i> ) . . . .	0.9	5 49 38.962	3.2473	+ 7 23 16.58	0.913
* $\beta$ Aurigæ . . . .	2.0	5 52 2.826	4.4020	+ 44 56 12.67	0.685
* $\theta$ Aurigæ . . . .	2.9	5 52 45.993	+ 4.0923	+ 37 12 19.19	+ 0.544
$\nu$ Orionis . . . .	4.5	6 1 44.963	+ 3.4275	+ 14 46 49.83	- 0.184
$\delta$ Ursæ Minoris . . . S. P.	4.4	6 5 11.837	-19.4830	+ 93 23 13.28	0.506
22 Camelopardalis (H.) . . .	4.7	6 7 36.139	+ 6.6166	+ 69 21 19.62	0.783
* $\eta$ Geminorum . . . .	3.5	6 8 43.282	3.6229	+ 22 32 10.67	0.779
$\mu$ Geminorum . . . .	3.2	6 16 47.425	+ 3.6314	+ 22 33 56.76	- 1.589
* $\psi^1$ Aurigæ . . . .	5.1	6 17 2.627	4.6261	+ 49 20 23.31	1.501
$\alpha$ Argûs ( <i>Canopus</i> ) . . . .	-0.8	6 21 41.330	+ 1.3305	- 52 38 23.70	1.886
* $\chi$ Draconis . . . S. P.	3.8	6 22 53.696	- 1.0803	+107 18 41.48	1.625
* $\nu$ Geminorum . . . .	4.2	6 22 54.394	+ 3.5629	+ 20 16 35.62	2.023
$\gamma$ Geminorum . . . .	2.0	6 31 49.180	+ 3.4672	+ 16 29 10.49	- 2.823
* $\epsilon$ Geminorum . . . .	3.2	6 37 39.393	3.6931	+ 25 13 55.39	3.294
* $\psi^5$ Aurigæ . . . .	5.4	6 39 23.205	4.3282	+ 43 40 43.68	3.282
† $\alpha$ Canis Majoris ( <i>Sirius</i> ) . . .	-1.4	6 40 39.207	2.6436	- 16 34 34.56	4.745
* $\theta$ Geminorum . . . .	3.7	6 46 4.053	+ 3.9599	+ 34 5 3.45	4.035
* $\zeta$ Mensæ . . . .	5.6	6 48 32.287	- 4.9156	- 80 42 22.73	- 4.134
50 Draconis . . . S. P.	5.6	6 49 39.773	- 1.9127	+104 41 10.73	4.386
51 Cephei (H.) . . . .	5.3	6 52 43.624	+29.6900	+ 87 12 29.54	4.610
$\epsilon$ Canis Majoris . . . .	1.5	6 54 37.051	2.3578	- 28 50 0.42	4.746
* $\zeta$ Geminorum ( <i>var.</i> ) . . . .	4.0	6 58 3.620	3.5620	+ 20 43 11.01	5.044
$\delta$ Canis Majoris . . . .	1.9	7 4 14.624	+ 2.4386	- 26 13 52.29	- 5.538
* 63 Aurigæ . . . .	5.2	7 4 38.451	+ 4.1354	+ 39 29 13.32	5.562
* $\gamma^2$ Volantis ( <i>var.</i> ) . . . .	3.9	7 9 36.628	- 0.4964	- 70 20 1.88	5.998
* 25 Camelopardalis . . . .	5.3	7 9 38.143	+12.9165	+ 82 36 28.76	6.033
$\delta$ Draconis . . . S. P.	3.1	7 12 31.966	0.0275	+112 31 4.44	6.327
$\delta$ Geminorum . . . .	3.5	7 14 1.921	+ 3.5873	+ 22 10 12.13	- 6.381
$\tau$ Draconis . . . S. P.	4.5	7 17 31.064	- 1.1220	+106 50 2.00	6.762
Piazzii vii, 67 . . . .	5.7	7 20 16.347	+ 6.2913	+ 68 40 26.26	6.918
* $\beta$ Canis Minoris . . . .	3.1	7 21 37.231	+ 3.2593	+ 8 29 40.99	7.029
$\lambda$ Ursæ Minoris . . . S. P.	6.5	7 24 45.821	-67.2805	+ 91 0 58.51	7.257
$\alpha^2$ Geminorum ( <i>Castor</i> ) . . . .	1.9	7 28 5.634	+ 3.8373	+ 32 6 44.53	- 7.596
† $\alpha$ Canis Min. ( <i>Procyon</i> ) . . . .	0.5	7 33 57.767	3.1430	+ 5 29 10.66	9.029
$\beta$ Geminorum ( <i>Pollux</i> ) . . . .	1.2	7 39 4.526	3.6780	+ 28 16 20.94	8.457
$\phi$ Geminorum . . . .	5.0	7 47 15.358	3.6788	+ 27 1 47.38	9.070
* 26 Lyncis . . . .	5.8	7 47 17.193	+ 4.3855	+ 47 49 43.62	- 9.068

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

† Periodic corrections given in the Appendix are still to be applied to the positions of Sirius and Procyon.

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Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
* Groombridge 1374 . . . . .	5.6	<sup>n</sup> <sup>m</sup> <sup>s</sup> 7 47 59.216	<sup>s</sup> + 7.2702	<sup>°</sup> <sup>'</sup> <sup>"</sup> + 74 11 24.97	<sup>"</sup> - 9.137
* $\epsilon$ Draconis . . . S. P.	3.9	7 48 31.005	- 0.1830	+109 59 30.61	9.171
* $\omega^1$ Cancrī . . . . .	6.0	7 54 45.644	+ 3.6362	+ 25 40 19.57	9.623
3 Ursæ Majoris (H.) . . . .	5.5	8 2 40.180	6.0387	+ 68 46 27.01	10.225
15 Argūs ( $\rho$ ) . . . . .	3.1	8 3 12.005	2.5545	- 24 0 36.99	10.222
* $\zeta^1$ Cancrī . . . . .	4.8	8 6 21.766	+ 3.4455	+ 17 57 17.16	-10.640
* $\beta$ Cancrī . . . . .	3.8	8 10 59.046	+ 3.2579	+ 9 29 59.08	10.890
* $\kappa$ Cephei ( <i>pr.</i> ) . . . S. P.	4.4	8 12 19.512	- 1.9373	+102 35 44.55	10.973
* 30 Monocerotis . . . . .	3.9	8 20 33.821	+ 2.9997	- 3 34 24.91	11.537
* $\theta$ Chamæleontis . . . . .	4.6	8 23 41.876	- 1.7243	- 77 9 19.50	11.742
* $\eta$ Cancrī . . . . .	5.4	8 26 48.716	+ 3.4772	+ 20 47 15.29	-12.038
Groombr. 3241 . . . S. P.	6.5	8 30 26.877	- 0.2257	+107 48 49.90	12.218
* $\sigma$ Hydræ . . . . .	4.5	8 33 25.752	+ 3.1454	+ 3 41 58.00	12.464
* $\gamma$ Cancrī . . . . .	4.9	8 37 23.070	3.4793	+ 21 50 6.80	12.756
* $\epsilon$ Hydræ . . . . .	3.5	8 41 22.521	3.1812	+ 6 47 34.71	13.034
* $\sigma^2$ Cancrī ( <i>mean</i> ) . . . . .	5.5	8 48 1.361	+ 3.6716	+ 30 57 56.30	-13.441
12 Year Cat. 1879. S. P.	5.3	8 52 13.144	- 2.5760	+ 99 49 48.80	13.659
* $\iota$ Ursæ Majoris . . . . .	3.3	8 52 13.517	+ 4.1296	+ 48 26 31.35	13.941
* $\sigma^3$ Ursæ Majoris . . . . .	5.0	9 1 25.302	5.3434	+ 67 32 55.35	14.323
* $\kappa$ Cancrī . . . . .	5.1	9 2 13.434	3.2550	+ 11 4 43.43	14.319
* $\theta$ Hydræ . . . . .	4.0	9 9 3.516	+ 3.1256	+ 2 44 40.15	-15.044
* $\beta$ Argūs . . . . .	2.0	9 12 4.822	0.6747	- 69 17 49.30	14.811
* $\iota$ Argūs . . . . .	2.6	9 14 21.383	1.6009	- 58 50 48.63	15.010
* $\alpha$ Lyncis . . . . .	3.3	9 14 50.493	3.6669	+ 34 49 25.13	15.056
* $\alpha$ Cephei . . . S. P.	2.6	9 16 8.747	1.4360	+117 50 48.11	15.185
1 Draconis (H.) . . . . .	4.5	9 22 33.474	+ 8.9324	+ 81 46 38.02	-15.522
* $\alpha$ Hydræ . . . . .	2.1	9 22 34.517	2.9490	- 8 12 59.51	15.474
* $\delta$ Ursæ Majoris . . . . .	4.8	9 25 27.869	5.3865	+ 70 16 42.65	15.603
* $\theta$ Ursæ Majoris . . . . .	3.2	9 26 2.106	4.0364	+ 52 8 31.45	16.249
* $\beta$ Cephei ( <i>pr.</i> ) . . . S. P.	3.4	9 27 20.645	0.7911	+109 53 13.85	15.762
* 10 Leonis Minoris . . . . .	4.7	9 27 58.614	+ 3.6917	+ 36 51 1.65	-15.811
* $\sigma$ Leonis . . . . .	3.8	9 35 42.435	+ 3.2061	+ 10 21 22.72	16.245
* $\zeta$ Chamæleontis . . . . .	5.2	9 36 53.771	- 1.5872	- 80 28 59.22	16.275
* $\epsilon$ Leonis . . . . .	3.2	9 40 3.746	+ 3.4136	+ 24 14 37.78	16.450
11 Cephei . . . S. P.	4.8	9 40 25.831	0.8986	+109 9 29.62	16.545
* $\mu$ Leonis . . . . .	4.0	9 46 57.810	+ 3.4204	+ 26 29 14.46	-16.820
* 19 Leonis Minoris . . . . .	5.2	9 51 26.354	3.6923	+ 41 32 29.06	16.986
* 79 Draconis . . . S. P.	6.6	9 51 35.453	0.7251	+106 46 48.82	17.018
* $\sigma$ Leonis . . . . .	5.0	9 54 49.420	3.1736	+ 8 32 0.84	17.157
* $\alpha$ Leonis ( <i>Regulus</i> ) . . . .	1.3	10 2 56.429	3.1997	+ 12 27 56.49	17.494
32 Ursæ Majoris . . . . .	5.7	10 10 37.771	+ 4.4111	+ 65 37 1.11	- 17.837
* $\lambda$ Ursæ Majoris . . . . .	3.6	10 10 56.784	3.6363	+ 43 25 24.09	17.893
* $\gamma^1$ Leonis . . . . .	2.5	10 14 20.984	3.3136	+ 20 21 27.00	18.105
* $\mu$ Hydræ . . . . .	4.1	10 21 9.478	2.9010	- 16 18 57.55	18.326
* $\beta$ Leonis Minoris . . . . .	4.3	10 21 59.202	3.4841	+ 37 13 47.79	18.333
* $\alpha$ Antliæ . . . . .	4.5	10 22 28.993	+ 2.7399	- 30 32 55.61	-18.232
9 Draconis (H.) . . . . .	5.0	10 26 26.267	5.2393	+ 76 14 17.85	18.421
* $\rho$ Leonis . . . . .	4.0	10 27 26.494	3.1635	+ 9 49 53.03	18.447
226 Cephei (B.) . . . S. P.	5.7	10 30 29.143	1.0745	+104 17 57.39	18.533
* $\beta$ Octantis . . . S. P.	4.4	10 35 38.125	+ 6.4290	- 98 5 2.25	-18.711

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.



MEAN PLACES FOR 1898.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.382, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
		h m s	s	° ' "	"
* 41 Leonis Minoris . . .	5.1	10 37 52.244	+ 3.2693	+ 23 43 20.73	-18.752
η Argūs ( <i>var.</i> ) . . .	1-6	10 41 6.106	2.3153	- 59 8 53.71	18.880
ι Leonis . . .	5.3	10 43 53.810	3.1578	+ 11 5 5.58	18.985
* 42 Chamæleontis . . .	4.7	10 44 49.956	0.6298	- 80 0 8.88	18.984
ι Cephei . . . S. P.	3.6	10 46 2.784	2.1237	+114 20 10.31	18.885
* 46 Leonis Minoris . . .	3.9	10 47 36.507	+ 3.3674	+ 34 45 54.06	-19.308
* Groombridge 1706 . . .	6.3	10 51 47.986	4.9427	+ 78 18 59.93	19.200
α Ursæ Majoris . . .	2.0	10 57 26.091	+ 3.7406	+ 62 18 6.02	19.376
* η Octantis . . .	6.1	11 0 3.109	- 0.2403	- 84 2 42.77	19.370
* ρ Leonis . . .	6.2	11 1 41.938	+ 3.0595	+ 2 30 33.10	19.493
* φ Ursæ Majoris . . .	3.2	11 3 55.806	+ 3.3903	+ 45 3 5.53	-19.514
δ Leonis . . .	2.7	11 8 41.082	3.1971	+ 21 4 56.89	19.694
* υ Ursæ Majoris . . .	3.7	11 12 58.406	3.2557	+ 33 39 3.46	19.581
δ Crateris . . .	3.9	11 14 14.467	2.9969	- 14 13 36.34	19.471
ο Cephei . . . S. P.	5.1	11 14 26.233	2.4475	+112 26 47.39	19.675
τ Leonis . . .	5.1	11 22 41.502	+ 3.0859	+ 3 25 4.53	-19.809
λ Draconis . . .	4.0	11 25 20.928	3.6120	+ 69 53 38.41	19.845
* ξ Hydræ . . .	3.8	11 27 59.032	2.9444	- 31 17 36.06	19.891
υ Leonis . . .	4.4	11 31 43.573	3.0713	- 0 15 38.50	19.865
γ Cephei . . . S. P.	3.5	11 35 9.315	2.4217	+102 56 13.41	20.078
* χ Ursæ Majoris . . .	3.9	11 40 39.988	+ 3.1874	+ 48 20 41.55	-19.965
β Leonis . . .	2.2	11 43 51.440	3.0634	+ 15 8 31.88	20.122
γ Ursæ Majoris . . .	2.4	11 48 28.102	3.1781	+ 54 15 42.23	20.029
Groombr. 4163 . . . S. P.	6.6	11 49 52.164	2.8729	+106 9 26.45	20.024
* π Virginis . . .	4.6	11 55 38.726	3.0739	+ 7 10 58.40	20.087
ο Virginis . . .	4.3	12 0 0.799	+ 3.0573	+ 9 17 58.01	-20.014
* ε Corvi . . .	3.2	12 4 52.702	3.0842	- 22 3 8.96	20.048
4 Draconis (H.) . . .	5.1	12 7 25.833	2.8754	+ 78 10 58.81	20.020
γ Corvi . . .	2.7	12 10 33.608	3.0806	- 16 58 32.33	20.015
* 2 Canum Venaticorum . .	6.0	12 11 0.992	3.0201	+ 41 13 40.94	20.063
β Chamæleontis . . .	4.5	12 12 21.549	+ 3.4157	- 78 44 44.38	-20.000
* 6 Ursæ Minoris . . .	6.2	12 14 21.998	0.2410	+ 88 15 55.91	19.939
η Virginis . . .	4.0	12 14 41.250	3.0689	- 0 6 0.24	20.039
α <sup>1</sup> Crucis . . .	0.9	12 20 55.409	3.3010	- 62 32 1.77	20.009
* 42 Corvi . . .	3.1	12 24 35.314	3.1036	- 15 56 50.67	20.080
* β Canum Venaticorum . .	4.4	12 28 53.986	+ 2.8579	+ 41 54 41.79	-19.610
β Corvi . . .	2.8	12 29 1.687	3.1430	- 22 49 57.95	19.957
α Draconis . . .	3.8	12 29 7.940	2.5873	+ 70 21 1.34	19.885
* γ Virginis ( <i>mean</i> ) . . .	2.9	12 36 29.520	3.0387	- 0 53 24.86	19.805
21 Cassiopeiæ . . . S. P.	5.7	12 38 54.141	3.8716	+105 34 9.95	19.743
* 31 Comæ Berenices . . .	5.1	12 46 43.963	+ 2.9294	+ 28 5 44.02	-19.653
32 <sup>2</sup> Camelopardalis (H.) . .	5.2	12 48 22.678	0.4108	+ 83 58 2.00	19.594
* γ Cassiopeiæ . . . S. P.	2.3	12 50 32.938	3.5851	+119 50 8.58	19.553
α Canum Venaticorum . .	3.2	12 51 15.479	2.8142	+ 38 52 8.85	19.504
* 43 Cephei (H.) . . . S. P.	4.6	12 54 46.580	7.3529	+ 94 17 24.04	19.483
* δ Muscæ . . .	3.8	12 55 16.565	+ 4.2262	- 70 59 53.88	-19.463
* ε Virginis . . .	3.1	12 57 6.006	2.9879	+ 11 30 26.32	19.408
ο Virginis . . .	4.6	13 4 40.061	3.1018	- 5 59 40.36	19.301
* 20 Canum Venaticorum . .	4.7	13 12 58.168	2.6957	+ 41 6 34.26	19.025
α Virginis ( <i>Spica</i> ) . . .	1.1	13 19 49.100	+ 3.1546	- 10 37 44.50	-18.887

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MEAN PLACES FOR 1898.0. (January 0 <sup>d</sup> .0—0 <sup>d</sup> .382, Washington.)								
Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.	Annual Variation.	
		h	m	s	s	°	'	
<i>α</i> Urs.Min. ( <i>Polaris</i> ) S. P.	2.2	13	21	43.699	+24.8320	+ 91	14 10.89	-18.790
38 Cassiopeizæ . S. P.	5.9	13	23	38.003	4.3902	+110	15 37.40	18.656
* <i>κ</i> Octantis . . .	5.4	13	24	26.146	8.8756	- 85	15 47.43	18.710
<i>ζ</i> Virginis . . .	3.6	13	29	29.702	3.0537	- 0	4 27.99	18.503
* B. A. C. 4536 . . .	5.0	13	30	14.524	2.6815	+ 37	42 17.55	18.526
* <i>m</i> Virginis . . .	5.4	13	36	15.467	+ 3.1442	- 8	11 17.79	-18.269
<i>η</i> Ursæ Majoris . . .	1.9	13	43	31.378	2.3704	+ 49	49 19.87	18.066
<i>η</i> Bootis . . .	2.8	13	49	49.692	2.8567	+ 18	54 32.34	18.154
50 Cassiopeizæ . S. P.	4.1	13	54	43.000	5.0273	+108	4 20.05	17.616
* <i>θ</i> Apodis ( <i>var.</i> ) . . .	5.0	13	55	23.341	5.6997	- 76	18 14.09	17.558
<i>β</i> Centauri . . .	0.7	13	56	37.104	+ 4.1849	- 59	52 51.93	-17.565
* <i>π</i> Hydræ . . .	3.6	14	0	33.624	3.4028	- 26	11 24.19	17.342
<i>α</i> Draconis . . .	3.7	14	1	37.722	1.6242	+ 64	51 47.36	17.289
* <i>δ</i> Bootis . . .	4.8	14	5	44.882	2.7386	+ 25	34 28.97	17.182
* <i>κ</i> Virginis . . .	4.2	14	7	27.242	+ 3.1949	- 9	47 56.62	16.904
* 4 Ursæ Minoris . . .	4.9	14	9	14.497	- 0.3095	+ 78	1 36.81	-16.903
* <i>δ</i> Octantis . . .	5.0	14	10	33.532	+ 9.0638	- 83	12 1.44	16.896
<i>α</i> Bootis ( <i>Arcturus</i> ) . . .	0.2	14	11	0.534	2.7352	+ 19	42 48.11	18.865
* <i>λ</i> Bootis . . .	4.3	14	12	30.369	2.2823	+ 46	33 23.61	16.645
* <i>λ</i> Virginis . . .	4.7	14	13	35.375	3.2391	- 12	54 6.16	16.724
<i>ε</i> Cassiopeizæ . S. P.	4.6	14	20	39.096	+ 4.8734	+113	3 22.49	-16.397
<i>θ</i> Bootis . . .	4.1	14	21	43.538	2.0441	+ 52	19 19.47	16.747
<i>ρ</i> Bootis . . .	3.6	14	27	26.126	+ 2.5876	+ 30	49 8.37	15.941
5 Ursæ Minoris . . .	4.5	14	27	44.320	- 0.1801	+ 76	8 57.75	16.012
<i>α</i> Centauri ( <i>mean</i> ) . . .	-0.1	14	32	40.172	+ 4.0407	- 60	24 51.75	15.027
* <i>μ</i> Hydri . . . S. P.	5.3	14	33	49.153	- 1.4130	-100	26 45.25	-15.692
* 33 Bootis . . .	5.3	14	35	2.482	+ 2.2341	+ 44	50 39.81	15.693
* <i>α</i> Apodis . . .	4.1	14	35	11.386	7.2306	- 78	36 42.52	15.630
<i>ε</i> Bootis . . .	2.6	14	40	32.013	2.6213	+ 27	30 14.80	15.321
<i>α</i> <sup>2</sup> Libræ . . .	2.9	14	45	14.045	+ 3.3108	- 15	37 4.77	15.141
<i>β</i> Ursæ Minoris . . .	2.2	14	51	0.015	- 0.2223	+ 74	34 20.29	-14.721
* 47 Cephei (H.) . S. P.	5.7	14	52	30.770	+ 7.7668	+100	59 4.52	14.631
* <i>γ</i> Scorpii . . .	3.4	14	58	5.913	3.5012	- 24	52 52.01	14.348
<i>β</i> Bootis . . .	3.7	14	58	6.258	2.2601	+ 40	47 33.79	14.341
48 Cephei (H.) . S. P.	5.5	15	7	22.083	7.4373	+102	38 24.46	13.663
* <i>δ</i> Bootis . . .	3.5	15	11	23.494	+ 2.4210	+ 33	41 43.63	-13.561
<i>β</i> Libræ . . .	2.9	15	11	31.032	3.2228	- 9	0 23.96	13.480
* <i>ρ</i> Octantis . . .	5.7	15	19	45.205	13.0968	- 84	7 30.46	12.864
<i>μ</i> <sup>1</sup> Bootis . . .	4.5	15	20	38.248	+ 2.2664	+ 37	44 5.60	12.759
<i>γ</i> <sup>2</sup> Ursæ Minoris . . .	3.2	15	20	53.369	- 0.1273	+ 72	11 48.97	12.812
* <i>β</i> Coronæ Borealis . . .	3.9	15	23	37.458	+ 2.4752	+ 29	27 25.47	-12.571
<i>α</i> Coronæ Borealis . . .	2.3	15	30	22.170	2.5395	+ 27	3 28.30	12.281
<i>α</i> Serpentis . . .	2.7	15	39	14.602	2.9522	+ 6	44 46.94	11.522
* <i>γ</i> Camelop. (H.) . S. P.	4.6	15	39	35.086	6.2521	+108	58 55.89	11.482
<i>ε</i> Serpentis . . .	3.7	15	45	43.868	+ 2.9877	+ 4	47 5.22	11.019
<i>ζ</i> Ursæ Minoris . . .	4.6	15	47	42.003	- 2.2342	+ 78	6 29.76	-10.944
<i>ε</i> Coronæ Borealis . . .	4.1	15	53	21.942	+ 2.4835	+ 27	10 23.45	10.586
<i>δ</i> Scorpii . . .	2.6	15	54	18.078	3.5400	- 22	19 53.11	10.491
<i>β</i> <sup>1</sup> Scorpii . . .	2.9	15	59	30.323	3.4820	- 19	31 34.88	10.102
* <i>δ</i> <sup>1</sup> Apodis . . .	4.9	16	5	6.052	+ 8.8034	- 78	26 18.11	- 9.638

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MEAN PLACES FOR 1898.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.382, Washington.)

Name of Star.	Magni- tude.	Right Ascension.			Annual Variation	Declination.			Annual Variation.
		<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	<sup>s</sup>	<sup>°</sup>	<sup>'</sup>	<sup>"</sup>	<sup>"</sup>
* $\varphi$ Herculis . . . . .	4.2	16	5	33.086	+ 1.8817	+ 45	12	8.19	- 9.561
Groombridge 2320 . . . . .	5.5	16	6	2.316	0.1432	+ 68	4	44.16	9.496
$\delta$ Ophiuchi . . . . .	2.8	16	8	59.983	3.1404	- 3	25	54.10	9.480
* $\sigma$ Coronæ Borealis ( <i>mean</i> ) . . . . .	5.3	16	10	51.451	2.2450	+ 34	7	2.19	9.233
$\tau$ Herculis . . . . .	3.9	16	16	40.498	1.8015	+ 46	33	21.72	8.715
* $\gamma$ Apodis . . . . .	4.0	16	17	48.844	+ 9.0916	- 78	40	4.73	- 8.648
* $\eta$ Ursæ Minoris . . . . .	5.0	16	20	28.983	- 1.8066	+ 75	59	25.59	8.182
$\eta$ Draconis . . . . .	2.8	16	22	36.712	+ 0.8079	+ 61	44	41.94	8.212
$\alpha$ Scorpii ( <i>Antares</i> ) . . . . .	1.2	16	23	9.134	3.6715	- 26	12	20.47	8.262
$\beta$ Herculis . . . . .	2.8	16	25	50.097	+ 2.5778	+ 21	42	42.66	8.028
A Draconis . . . . .	5.0	16	28	11.111	- 0.1315	+ 68	59	18.94	- 7.799
$\zeta$ Ophiuchi . . . . .	2.8	16	31	32.498	+ 3.2998	- 10	21	37.88	7.527
$\alpha$ Trianguli Australis . . . . .	2.2	16	37	51.839	6.3113	- 68	50	24.61	7.084
$\eta$ Herculis . . . . .	3.7	16	39	23.896	2.0541	+ 39	6	58.20	6.997
$\alpha$ Camelopardalis . S. P. . . . .	4.4	16	43	54.241	5.9308	+113	49	50.80	6.535
$\kappa$ Ophiuchi . . . . .	3.4	16	52	50.406	+ 2.8378	+ 9	32	1.03	- 5.799
$\epsilon$ Ursæ Minoris . . . . .	4.5	16	56	25.071	- 6.3048	+ 82	12	18.46	5.494
$d$ Herculis . . . . .	5.3	16	57	50.376	+ 2.2116	+ 33	42	57.40	5.371
* $\eta$ Ophiuchi . . . . .	2.5	17	4	31.628	3.4361	- 15	35	55.35	4.728
$\alpha^1$ Herculis ( <i>var.</i> ) . . . . .	3.2	17	9	59.774	2.7338	+ 14	30	23.51	4.313
* $\pi$ Herculis . . . . .	3.4	17	11	29.687	+ 2.0894	+ 36	55	26.55	- 4.204
* $\theta$ Ophiuchi . . . . .	3.3	17	15	44.660	3.6800	- 24	53	52.38	3.901
$\delta$ Ophiuchi ( <i>var.</i> ) . . . . .	4.4	17	20	8.416	3.6597	- 24	4	53.27	3.602
* $\delta$ Aræ . . . . .	3.8	17	21	53.516	5.4039	- 60	35	56.33	3.460
Groombridge 966 S. P. . . . .	6.4	17	26	5.588	8.0068	+105	1	26.12	2.975
$\beta$ Draconis . . . . .	3.0	17	28	7.700	+ 1.3538	+ 52	22	36.11	- 2.780
* Groombridge 944 S. P. . . . .	6.4	17	29	17.785	18.7043	+ 94	51	15.07	2.692
$\alpha$ Ophiuchi . . . . .	2.2	17	30	11.963	2.7831	+ 12	38	3.12	2.837
* $\epsilon$ Herculis . . . . .	4.0	17	36	35.274	+ 1.6669	+ 46	3	37.74	2.046
$\omega$ Draconis . . . . .	4.9	17	37	32.976	- 0.3529	+ 68	48	18.22	1.637
$\mu$ Herculis . . . . .	3.5	17	42	28.011	+ 2.3467	+ 27	46	48.55	- 2.292
$\phi^1$ Draconis . . . . .	4.8	17	43	45.052	- 1.0774	+ 72	11	55.70	1.693
* $\theta$ Herculis . . . . .	3.9	17	52	45.251	+ 2.0553	+ 37	15	50.43	0.615
$\gamma$ Draconis . . . . .	2.5	17	54	14.247	1.3918	+ 51	30	2.62	0.534
$\gamma^3$ Sagittarii . . . . .	2.9	17	59	15.300	3.8517	- 30	25	31.54	- 0.284
* $\sigma$ Herculis . . . . .	3.9	18	3	33.822	+ 2.3396	+ 28	44	53.99	+ 0.315
$\delta$ Ursæ Minoris . . . . .	4.4	18	5	11.837	-19.4830	+ 86	36	46.71	0.506
22 Camelop. (H.) . S. P. . . . .	4.7	18	7	36.139	+ 6.6166	+110	38	40.38	0.783
$\mu^1$ Sagittarii . . . . .	4.1	18	7	39.791	3.5867	- 21	5	7.84	0.658
$\eta$ Serpentis . . . . .	3.5	18	16	1.895	3.1025	- 2	55	29.98	0.726
* $\lambda$ Sagittarii . . . . .	2.9	18	21	40.539	+ 3.7025	- 25	28	42.04	+ 1.671
* $\chi$ Draconis . . . . .	3.8	18	22	53.696	- 1.0803	+ 72	41	18.52	1.625
$\iota$ Aquilæ . . . . .	4.0	18	29	39.388	+ 3.2645	- 8	18	55.93	2.258
* $\zeta$ Pavonis . . . . .	4.2	18	31	6.899	7.0258	- 71	30	53.13	2.574
$\alpha$ Lyræ ( <i>Vega</i> ) . . . . .	0.2	18	33	29.116	2.0314	+ 38	41	18.80	3.192
$\beta$ Lyræ ( <i>var.</i> ) . . . . .	3.6	18	46	18.851	+ 2.2143	+ 33	14	38.55	+ 4.007
$\sigma$ Sagittarii . . . . .	2.3	18	48	56.440	+ 3.7212	- 26	25	24.46	4.173
50 Draconis . . . . .	5.6	18	49	39.773	- 1.9127	+ 75	18	49.27	4.386
51 Cephei (H.) . S. P. . . . .	5.3	18	52	43.624	+29.6900	+ 92	47	30.46	4.610
* $\gamma$ Lyræ . . . . .	3.3	18	55	7.701	+ 2.2445	+ 32	32	58.66	+ 4.788

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

MEAN PLACES FOR 1898.0. (January 0 <sup>d</sup> .0—0 <sup>d</sup> .382, Washington.)							
Name of Star.	Magni- tude.	Right Ascension.			Annual Variation.	Declination.	Annual Variation.
		h	m	s	"	° ' "	"
α Octantis . . . . .	5.6	18	56	20.506	+103.2947	− 89 15 26.99	+ 4.862
ζ Aquilæ . . . . .	3.1	19	0	43.320	2.7569	+ 13 42 42.38	5.147
* ε Lyrae . . . . .	5.2	19	3	39.756	2.1413	+ 35 56 24.93	5.508
* 25 Camelopardalis . S. P.	5.3	19	9	38.143	12.9165	+ 97 23 31.24	6.033
δ Sagittarii . . . . .	5.0	19	11	40.022	3.5117	− 19 8 3.91	6.150
δ Draconis . . . . .	3.1	19	12	31.966	+ 0.0275	+ 67 28 55.56	+ 6.327
* θ Lyrae . . . . .	4.4	19	12	49.582	+ 2.0791	+ 37 57 6.76	6.266
τ Draconis . . . . .	4.5	19	17	31.064	− 1.1220	+ 73 9 58.00	6.762
Piazzi vii, 67 . S. P.	5.7	19	20	16.347	+ 6.2913	+111 19 33.74	6.918
δ Aquilæ . . . . .	3.5	19	20	21.329	+ 3.0251	+ 2 54 40.88	6.964
λ Ursæ Minoris . . . . .	6.5	19	24	45.821	−67.2855	+ 88 59 1.49	+ 7.257
* β Cygni . . . . .	3.1	19	26	36.479	+ 2.4195	+ 27 44 43.21	7.391
* α Aquilæ . . . . .	5.0	19	31	24.233	3.2285	− 7 15 15.10	7.787
* β Sagittæ . . . . .	4.5	19	36	28.080	2.6955	+ 17 14 22.31	8.165
γ Aquilæ . . . . .	2.8	19	41	24.627	2.8521	+ 10 21 52.60	8.578
* δ Cygni . . . . .	2.9	19	41	47.258	+ 1.8761	+ 44 52 53.87	+ 8.652
α Aquilæ ( <i>Altair</i> ) . . . . .	0.9	19	45	48.407	2.9274	+ 8 35 55.71	9.303
* Groombridge 1374 S.P.	5.6	19	47	59.216	+ 7.2702	+105 48 35.03	9.137
ε Draconis . . . . .	3.9	19	48	31.005	− 0.1830	+ 70 0 29.39	9.171
* ε Pavonis . . . . .	4.1	19	48	47.376	+ 7.0074	− 73 10 43.15	9.166
β Aquilæ . . . . .	3.9	19	50	18.178	+ 2.9469	+ 6 9 6.67	+ 8.791
γ Sagittæ . . . . .	3.6	19	54	13.265	2.6678	+ 19 12 54.55	9.623
* ε Sagittarii . . . . .	4.5	19	56	23.230	3.6957	− 27 59 35.87	9.768
τ Aquilæ . . . . .	5.7	19	59	9.494	2.9329	+ 6 59 23.91	9.970
3 Ursæ Majoris (H.) S.P.	5.5	20	2	40.180	6.0387	+111 13 32.99	10.225
* θ Aquilæ . . . . .	3.3	20	6	2.497	+ 3.0968	− 1 7 26.91	+10.490
* 31 Cygni . . . . .	3.9	20	10	25.200	+ 1.8894	+ 46 25 54.72	10.808
* α Cephei ( <i>pr.</i> ) . . . . .	4.4	20	12	19.512	− 1.9373	+ 77 24 15.45	10.973
* α Capricorni . . . . .	3.7	20	12	23.737	+ 3.3314	− 12 51 39.64	10.950
* α Pavonis . . . . .	2.1	20	17	35.231	4.7790	− 57 3 42.19	11.237
γ Cygni . . . . .	2.3	20	18	34.167	+ 2.1539	+ 39 55 48.16	+11.392
* α Capricorni . . . . .	5.1	20	21	29.024	3.4386	− 18 32 46.15	11.590
* ε Delphini . . . . .	4.0	20	28	20.429	+ 2.8671	+ 10 57 23.89	12.070
Groombridge 3241 . . . . .	6.5	20	30	26.877	− 0.2257	+ 72 11 10.10	12.218
* α Delphini . . . . .	3.9	20	34	54.028	+ 2.7878	+ 15 33 7.63	12.548
* β Pavonis . . . . .	3.4	20	35	46.202	+ 5.4641	− 66 34 10.24	+12.582
* α Cygni . . . . .	1.4	20	37	57.294	2.0446	+ 44 54 56.47	12.743
* φ Capricorni . . . . .	4.3	20	40	3.426	3.5594	− 25 38 14.85	12.731
* ε Cygni . . . . .	2.6	20	42	5.061	2.4280	+ 33 35 16.87	13.363
* μ Aquarii . . . . .	4.8	20	47	9.170	+ 3.2391	− 9 21 58.22	13.318
12 Year Catalogue, 1879 . . . . .	5.3	20	52	13.144	− 2.5760	+ 80 10 11.20	+13.659
* γ Cygni . . . . .	4.1	20	53	22.209	+ 2.2345	+ 40 46 27.72	13.745
* α Ursæ Majoris . S. P.	5.0	21	1	25.302	5.3434	+112 27 4.65	14.323
61 <sup>1</sup> Cygni . . . . .	5.4	21	2	19.430	2.6836	+ 38 14 51.49	17.557
ζ Cygni . . . . .	3.3	21	8	35.644	2.5500	+ 29 48 30.13	14.634
* τ Cygni . . . . .	3.8	21	10	43.178	+ 2.3938	+ 37 36 35.94	+15.282
* α Cephei . . . . .	2.6	21	16	8.747	1.4360	+ 62 9 11.89	15.185
* 1 Pegasi . . . . .	4.3	21	17	22.111	2.7724	+ 19 22 4.72	15.262
* ζ Capricorni . . . . .	3.8	21	20	50.695	3.4330	− 22 51 11.82	15.411
1 Draconis (H.) . S. P.	4.5	21	22	33.474	+ 8.9324	+ 98 13 21.98	+15.522

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

MEAN PLACES FOR 1898.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.382, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Variation.	Declination.	Annual Variation.
<i>d</i> Ursæ Majoris . S. P.	4.8	<sup>h</sup> 21 <sup>m</sup> 25 <sup>s</sup> 27.869	+ 5.3865	+109 43 17.35	+15.603
<i>β</i> Aquarii . . . .	2.9	21 26 11.391	3.1612	— 6 1 12.02	15.687
<i>β</i> Cephei ( <i>pr.</i> ) . . . .	3.4	21 27 20.645	0.7911	+ 70 6 46.15	15.762
<i>ξ</i> Aquarii . . . .	4.8	21 32 19.372	3.1972	— 8 18 42.20	15.996
* 74 Cygni . . . .	5.0	21 32 51.626	2.4021	+ 39 57 18.14	16.070
* <i>λ</i> <sup>1</sup> Octantis . . . .	5.4	21 35 16.169	+ 9.6934	— 83 11 17.55	+16.108
* <i>ζ</i> Chamæleontis . S. P.	5.2	21 36 53.771	— 1.5872	— 99 31 0.78	16.275
<i>ε</i> Pegasi . . . .	2.4	21 39 10.599	+ 2.9467	+ 9 24 26.22	16.378
11 Cephei . . . .	4.8	21 40 25.831	0.8986	+ 70 50 30.38	16.545
* <i>π</i> <sup>2</sup> Cygni . . . .	4.5	21 43 1.489	2.2138	+ 48 50 15.16	16.559
<i>μ</i> Capricorni . . . .	5.2	21 47 44.132	+ 3.2751	— 14 1 55.24	+16.802
* 16 Pegasi . . . .	5.1	21 48 25.245	2.7283	+ 25 26 42.56	16.838
79 Draconis . . . .	6.6	21 51 35.453	0.7251	+ 73 13 11.18	17.018
<i>α</i> Aquarii . . . .	3.0	22 0 32.708	3.0824	— 0 48 55.61	17.376
<i>α</i> Gruis . . . .	1.9	22 1 48.323	3.8021	— 47 27 17.62	17.271
* <i>π</i> Pegasi . . . .	4.3	22 5 27.419	+ 2.6608	+ 32 40 40.06	+17.596
32 Ursæ Majoris . S. P.	5.7	22 10 37.771	4.4111	+114 22 58.89	17.837
<i>θ</i> Aquarii . . . .	4.4	22 11 27.102	3.1685	— 8 17 28.47	17.820
* <i>υ</i> Octantis . . . .	6.2	22 12 9.094	12.8816	— 86 29 8.73	17.964
* <i>γ</i> Aquarii . . . .	4.0	22 16 23.266	3.1004	— 1 54 4.95	18.056
<i>π</i> Aquarii . . . .	4.6	22 20 4.095	+ 3.0645	+ 0 51 35.10	+18.171
* <i>σ</i> Aquarii . . . .	4.9	22 25 14.939	3.1775	— 11 11 59.68	18.334
9 Draconis . . . S. P.	5.0	22 26 26.267	5.2393	+103 45 42.15	18.421
* <i>α</i> Lacertæ . . . .	3.9	22 27 5.277	2.4637	+ 49 45 28.56	18.427
<i>η</i> Aquarii . . . .	4.2	22 30 6.900	3.0834	— 0 38 35.78	18.472
226 Cephei (B.) . . . .	5.7	22 30 29.143	+ 1.0745	+ 75 42 2.61	+18.533
* 10 Lacertæ . . . .	5.0	22 34 41.032	2.6877	+ 38 31 9.66	18.681
* <i>β</i> Octantis . . . .	4.4	22 35 38.125	6.4290	— 81 54 57.75	18.711
<i>ζ</i> Pegasi . . . .	3.5	22 36 22.495	2.9911	+ 10 17 55.92	18.719
* <i>λ</i> Pegasi . . . .	4.1	22 41 37.042	2.8859	+ 23 1 43.87	18.887
<i>ι</i> Cephei . . . .	3.6	22 46 2.784	+ 2.1237	+ 65 39 49.69	+18.885
<i>λ</i> Aquarii . . . .	3.8	22 47 17.631	3.1322	— 8 7 20.45	19.087
* Groombr. 1706 . S. P.	6.3	22 51 47.986	4.9427	+101 41 0.07	19.200
<i>α</i> Pis. Aust. ( <i>Fomalhaut</i> ). . . .	1.3	22 52 0.873	3.3230	— 30 9 46.31	19.005
* <i>ο</i> Andromedæ . . . .	3.8	22 57 13.602	2.7515	+ 41 46 39.34	19.296
<i>α</i> Ursæ Majoris . S. P.	2.0	22 57 26.091	+ 3.7406	+117 41 53.98	+19.376
<i>α</i> Pegasi ( <i>Markab</i> ) . . . .	2.5	22 59 40.777	2.9855	+ 14 39 22.89	19.311
* <i>φ</i> Aquarii . . . .	4.3	23 9 2.428	3.1084	— 6 35 55.78	19.366
<i>ο</i> Cephei . . . .	5.1	23 14 26.233	2.4475	+ 67 33 12.61	19.675
* <i>τ</i> Pegasi . . . .	4.6	23 15 35.256	2.9645	+ 23 10 54.64	19.662
<i>θ</i> Piscium . . . .	4.3	23 22 47.611	+ 3.0414	+ 5 49 6.70	+19.733
<i>λ</i> Draconis . . . S. P.	4.0	23 25 20.928	3.6120	+110 6 21.59	19.845
* <i>λ</i> Andromedæ . . . .	3.8	23 32 34.253	2.9245	+ 45 54 18.78	19.476
<i>ι</i> Piscium . . . .	4.3	23 34 42.229	3.0844	+ 5 4 24.28	19.487
<i>γ</i> Cephei . . . .	3.5	23 35 9.315	2.4217	+ 77 3 46.59	20.078
* <i>i</i> <sup>1</sup> Aquarii . . . .	5.2	23 38 54.733	+ 3.1161	— 18 50 34.76	+19.962
* <i>δ</i> Sculptoris . . . .	4.6	23 43 36.832	3.1311	— 28 41 39.06	19.859
* <i>γ</i> <sup>1</sup> Octantis . . . .	5.2	23 46 6.763	3.6616	— 82 35 8.63	19.995
Groombridge 4163 . . . .	6.6	23 49 52.164	2.8729	+ 73 50 33.55	20.024
<i>ω</i> Piscium . . . .	4.2	23 54 4.400	3.0788	+ 6 17 54.87	19.931
* 33 Piscium . . . .	4.7	24 0 6.878	+ 3.0708	— 6 16 40.97	+20.147

\* Apparent right ascensions of stars marked with an asterisk are given after those of standard stars.

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hrv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
Jan.	<sup>h</sup> <sup>m</sup> 1 21	+88 46	Jan.	<sup>h</sup> <sup>m</sup> 6 53	+87 12	Jan.	<sup>h</sup> <sup>m</sup> 18 4	+86 36	Jan.	<sup>h</sup> <sup>m</sup> 19 23	+88 58
0.3	<sup>s</sup> 51.72	16.2	0.5	<sup>s</sup> 21.92	30.7	0.9	<sup>s</sup> 42.95	39.6	0.0	<sup>s</sup> 4.56	64.1
1.3	50.83	16.3	1.5	21.99	31.0	1.9	43.01	39.3	1.0	4.25	63.8
2.3	50.00	16.5	2.5	22.06	31.3	2.9	43.04	39.0	2.0	3.96	63.5
3.3	49.18	16.6	3.5	22.16	31.5	3.9	43.05	38.7	3.0	3.64	63.3
4.3	48.35	16.7	4.5	22.27	31.8	4.9	43.04	38.4	4.0	3.27	63.0
5.3	47.48	16.8	5.5	22.40	32.1	5.9	43.05	38.1	5.0	2.88	62.7
6.3	46.56	16.9	6.5	22.52	32.4	6.9	43.06	37.8	6.0	2.45	62.4
7.3	45.58	17.0	7.5	22.62	32.8	7.9	43.07	37.4	7.0	2.03	62.1
8.3	44.55	17.1	8.5	22.72	33.1	8.9	43.12	37.1	8.0	1.65	61.8
9.3	43.46	17.2	9.5	22.78	33.4	9.9	43.19	36.7	9.0	1.30	61.4
10.2	42.36	17.2	10.5	22.80	33.8	10.9	43.28	36.3	10.0	1.05	61.1
11.2	41.29	17.3	11.5	22.79	34.2	11.9	43.37	36.0	11.0	0.87	60.7
12.2	40.23	17.3	12.5	22.76	34.5	12.9	43.50	35.6	12.0	0.76	60.3
13.2	39.21	17.3	13.5	22.73	34.8	13.9	43.62	35.3	13.0	0.72	60.0
14.2	38.26	17.3	14.5	22.69	35.1	14.9	43.74	35.1	13.9	0.72	59.7
15.2	37.37	17.3	15.5	22.65	35.4	15.9	43.85	34.8	14.9	0.72	59.4
16.2	36.49	17.3	16.5	22.63	35.6	16.9	43.95	34.5	15.9	0.71	59.1
17.2	35.64	17.3	17.5	22.63	35.9	17.9	44.03	34.2	16.9	0.65	58.8
18.2	34.78	17.4	18.5	22.63	36.2	18.9	44.12	33.9	17.9	0.57	58.5
19.2	33.89	17.4	19.5	22.65	36.5	19.9	44.21	33.6	18.9	0.46	58.2
20.2	32.94	17.4	20.4	22.66	36.8	20.9	44.31	33.3	19.9	0.33	57.9
21.2	31.95	17.4	21.4	22.65	37.1	21.9	44.44	33.0	20.9	0.22	57.6
22.2	30.90	17.4	22.4	22.62	37.5	22.9	44.58	32.6	21.9	0.17	57.3
23.2	29.82	17.4	23.4	22.56	37.8	23.9	44.74	32.3	22.9	0.18	56.9
24.2	28.73	17.4	24.4	22.46	38.1	24.9	44.92	32.0	23.9	0.26	56.6
25.2	27.65	17.3	25.4	22.32	38.4	25.9	45.14	31.7	24.9	0.44	56.2
26.2	26.63	17.3	26.4	22.15	38.8	26.9	45.35	31.4	25.9	0.70	55.9
27.2	25.65	17.2	27.4	21.98	39.1	27.9	45.57	31.1	26.9	1.03	55.6
28.2	24.73	17.1	28.4	21.80	39.3	28.9	45.78	30.9	27.9	1.38	55.3
29.2	23.86	17.0	29.4	21.63	39.6	29.9	46.00	30.7	28.9	1.75	55.0
30.2	23.02	16.9	30.4	21.48	39.8	30.9	46.20	30.4	29.9	2.09	54.7
31.2	22.19	16.8	31.4	21.34	40.1	31.9	46.39	30.2	30.9	2.41	54.4
32.2	21.35	16.7	32.4	21.21	40.4	32.9	46.57	30.0	31.9	2.70	54.1

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hrv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
Feb.	h m 1 20	+88 46	Feb.	h m 6 53	+87 12	Feb.	h m 18 4	+86 36	Feb.	h m 19 23	+88 58
	°	'		°	'		°	'		°	'
1.2	81.35	16.7	1.4	21.21	40.4	1.9	46.57	30.0	1.9	2.94	53.9
2.2	80.48	16.6	2.4	21.09	40.6	2.9	46.76	29.7	2.9	3.18	53.6
3.2	79.56	16.6	3.4	20.97	40.9	3.9	46.97	29.4	3.9	3.45	53.3
4.2	78.60	16.5	4.4	20.82	41.2	4.9	47.17	29.1	4.9	3.76	52.9
5.2	77.61	16.4	5.4	20.65	41.5	5.9	47.41	28.8	5.9	4.13	52.6
6.2	76.57	16.3	6.4	20.45	41.8	6.9	47.67	28.6	6.9	4.59	52.3
7.2	75.57	16.2	7.4	20.22	42.1	7.9	47.96	28.3	7.9	5.12	51.9
8.2	74.59	16.0	8.4	19.95	42.4	8.9	48.24	28.1	8.9	5.72	51.6
9.2	73.66	15.9	9.4	19.68	42.7	9.9	48.53	27.8	9.9	6.36	51.3
10.2	72.79	15.7	10.4	19.40	43.0	10.9	48.82	27.6	10.9	7.02	51.0
11.2	72.00	15.5	11.4	19.12	43.2	11.9	49.10	27.5	11.9	7.66	50.8
12.2	71.25	15.3	12.4	18.86	43.4	12.9	49.37	27.3	12.9	8.26	50.6
13.2	70.55	15.2	13.4	18.63	43.6	13.9	49.62	27.1	13.9	8.84	50.3
14.2	69.83	15.0	14.4	18.41	43.8	14.9	49.87	27.0	14.9	9.37	50.1
15.1	69.12	14.9	15.4	18.19	44.0	15.9	50.11	26.8	15.9	9.89	49.8
16.1	68.36	14.7	16.4	17.99	44.2	16.8	50.35	26.6	16.9	10.38	49.6
17.1	67.58	14.6	17.4	17.76	44.5	17.8	50.62	26.3	17.9	10.92	49.3
18.1	66.73	14.5	18.4	17.53	44.7	18.8	50.90	26.1	18.9	11.51	49.0
19.1	65.86	14.3	19.4	17.26	45.0	19.8	51.20	25.9	19.9	12.18	48.8
20.1	64.98	14.1	20.4	16.97	45.2	20.8	51.52	25.7	20.9	12.92	48.5
21.1	64.12	13.9	21.4	16.62	45.5	21.8	51.86	25.5	21.9	13.77	48.2
22.1	63.30	13.6	22.4	16.27	45.7	22.8	52.23	25.3	22.9	14.65	48.0
23.1	62.56	13.4	23.4	15.89	45.9	23.8	52.58	25.2	23.9	15.59	47.7
24.1	61.86	13.2	24.3	15.51	46.1	24.8	52.93	25.1	24.9	16.53	47.5
25.1	61.23	12.9	25.3	15.14	46.3	25.8	53.26	25.0	25.9	17.48	47.3
26.1	60.64	12.6	26.3	14.79	46.4	26.8	53.59	24.9	26.9	18.36	47.1
27.1	60.09	12.4	27.3	14.45	46.6	27.8	53.91	24.8	27.9	19.22	46.9
28.1	59.54	12.2	28.3	14.12	46.7	28.8	54.22	24.7	28.9	20.05	46.8
29.1	58.98	12.0	29.3	13.81	46.9	29.8	54.53	24.6	29.9	20.85	46.6

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\epsilon$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Mar.	h m	° ' "	Mar.	h m	° ' "	Mar.	h m	° ' "	Mar.	h m	° ' "
	1 20	+88 46		6 53	+87 12		18 4	+86 36		19 23	+88 58
1.1	58.98	12.0	1.3	13.81	46.9	1.8	54.53	24.6	1.9	20.85	46.6
2.1	58.39	11.8	2.3	13.51	47.0	2.8	54.83	24.5	2.9	21.64	46.4
3.1	57.74	11.6	3.3	13.20	47.2	3.8	55.17	24.3	3.9	22.45	46.2
4.1	57.09	11.3	4.3	12.86	47.4	4.8	55.50	24.2	4.9	23.33	45.9
5.1	56.39	11.1	5.3	12.50	47.6	5.8	55.85	24.0	5.9	24.26	45.7
6.1	55.71	10.8	6.3	12.10	47.8	6.8	56.23	23.9	6.9	25.27	45.5
7.1	55.06	10.6	7.3	11.68	48.0	7.8	56.61	23.8	7.9	26.34	45.3
8.1	54.46	10.3	8.3	11.25	48.1	8.8	56.98	23.8	8.9	27.43	45.1
9.1	53.93	10.0	9.3	10.80	48.2	9.8	57.36	23.7	9.8	28.58	44.9
10.1	53.47	9.7	10.3	10.38	48.3	10.8	57.74	23.7	10.8	29.69	44.8
11.1	53.09	9.4	11.3	9.96	48.4	11.8	58.11	23.6	11.8	30.79	44.7
12.1	52.74	9.1	12.3	9.56	48.5	12.8	58.45	23.6	12.8	31.82	44.6
13.1	52.42	8.8	13.3	9.20	48.6	13.8	58.76	23.6	13.8	32.82	44.5
14.1	52.11	8.6	14.3	8.85	48.6	14.8	59.08	23.6	14.8	33.76	44.3
15.1	51.79	8.3	15.3	8.51	48.7	15.8	59.40	23.6	15.8	34.68	44.2
16.1	51.41	8.1	16.3	8.16	48.8	16.8	59.72	23.5	16.8	35.61	44.1
17.1	51.01	7.8	17.3	7.81	48.9	17.8	60.06	23.5	17.8	36.58	44.0
18.1	50.59	7.6	18.3	7.44	49.0	18.8	60.41	23.4	18.8	37.59	43.8
19.1	50.15	7.3	19.3	7.03	49.1	19.8	60.78	23.4	19.8	38.68	43.7
20.1	49.71	7.0	20.3	6.60	49.2	20.8	61.16	23.4	20.8	39.85	43.5
21.1	49.31	6.7	21.3	6.14	49.3	21.8	61.56	23.4	21.8	41.07	43.4
22.1	48.98	6.3	22.3	5.67	49.4	22.7	61.97	23.4	22.8	42.33	43.3
23.1	48.72	6.0	23.3	5.19	49.4	23.7	62.35	23.4	23.8	43.61	43.2
24.1	48.53	5.6	24.3	4.72	49.4	24.7	62.72	23.5	24.8	44.87	43.2
25.1	48.40	5.3	25.3	4.27	49.4	25.7	63.09	23.6	25.8	46.09	43.1
26.1	48.31	5.0	26.3	3.84	49.4	26.7	63.43	23.7	26.8	47.25	43.1
27.1	48.24	4.7	27.3	3.44	49.4	27.7	63.77	23.7	27.8	48.36	43.1
28.1	48.17	4.4	28.3	3.05	49.4	28.7	64.09	23.8	28.8	49.44	43.0
29.1	48.07	4.1	29.3	2.67	49.4	29.7	64.41	23.8	29.8	50.49	43.0
30.1	47.94	3.8	30.3	2.29	49.4	30.7	64.75	23.9	30.8	51.54	43.0
31.1	47.76	3.6	31.3	1.90	49.4	31.7	65.08	23.9	31.8	52.63	42.9
32.1	47.59	3.3	32.3	1.49	49.5	32.7	65.43	24.0	32.8	53.76	42.8



## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Data.	α Ursæ Minoris. (Polaris.)		Mean Solar Data.	γ Cephei (Hrv.)		Mean Solar Data.	δ Ursæ Minoris.		Mean Solar Data.	λ Ursæ Minoris.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
Apr.	<sup>h</sup> <sup>m</sup> 1 20	+88 45	Apr.	<sup>h</sup> <sup>m</sup> 6 52	+87 12	Apr.	<sup>h</sup> <sup>m</sup> 18 5	+86 36	Apr.	<sup>h</sup> <sup>m</sup> 19 23	+88 58
1.0	47.59	63.3	1.2	61.49	49.5	1.7	5.43	24.0	1.8	53.76	42.8
2.0	47.39	63.0	2.2	61.07	49.5	2.7	5.79	24.0	2.8	54.95	42.8
3.0	47.22	62.6	3.2	60.61	49.5	3.7	6.17	24.1	3.8	56.19	42.7
4.0	47.10	62.3	4.2	60.15	49.5	4.7	6.53	24.2	4.8	57.47	42.7
5.0	47.05	62.0	5.2	59.68	49.5	5.7	6.92	24.3	5.8	58.76	42.7
6.0	47.07	61.6	6.2	59.22	49.4	6.7	7.28	24.4	6.8	60.05	42.7
7.0	47.16	61.3	7.2	58.75	49.3	7.7	7.64	24.6	7.8	61.32	42.7
8.0	47.31	60.9	8.2	58.34	49.2	8.7	7.96	24.7	8.8	62.51	42.8
9.0	47.50	60.6	9.2	57.93	49.1	9.7	8.27	24.9	9.8	63.64	42.8
10.0	47.71	60.4	10.2	57.57	49.0	10.7	8.56	25.0	10.8	64.73	42.9
10.9	47.91	60.1	11.2	57.21	49.0	11.7	8.84	25.2	11.8	65.76	42.9
11.9	48.09	59.8	12.2	56.86	48.9	12.7	9.13	25.3	12.8	66.78	43.0
12.9	48.21	59.5	13.2	56.52	48.8	13.7	9.40	25.4	13.8	67.80	43.0
13.9	48.31	59.3	14.2	56.17	48.8	14.7	9.70	25.6	14.8	68.86	43.0
14.9	48.39	59.0	15.2	55.77	48.7	15.7	10.03	25.7	15.8	69.98	43.1
15.9	48.47	58.7	16.2	55.37	48.7	16.7	10.35	25.8	16.8	71.14	43.1
16.9	48.57	58.4	17.2	54.95	48.6	17.7	10.68	26.0	17.7	72.38	43.1
17.9	48.73	58.1	18.2	54.51	48.5	18.7	11.03	26.1	18.7	73.65	43.2
18.9	48.95	57.7	19.2	54.06	48.4	19.7	11.36	26.3	19.7	74.93	43.3
19.9	49.25	57.4	20.2	53.61	48.2	20.7	11.67	26.5	20.7	76.20	43.4
20.9	49.61	57.0	21.2	53.20	48.1	21.7	11.98	26.8	21.7	77.41	43.5
21.9	50.02	56.7	22.2	52.81	47.9	22.7	12.27	27.0	22.7	78.55	43.6
22.9	50.46	56.4	23.2	52.43	47.8	23.7	12.53	27.2	23.7	79.66	43.8
23.9	50.89	56.2	24.2	52.09	47.6	24.7	12.78	27.4	24.7	80.70	43.9
24.9	51.32	55.9	25.2	51.76	47.4	25.7	13.02	27.7	25.7	81.68	44.0
25.9	51.71	55.6	26.2	51.45	47.3	26.7	13.27	27.9	26.7	82.64	44.1
26.9	52.05	55.4	27.2	51.15	47.1	27.7	13.52	28.0	27.7	83.61	44.2
27.9	52.37	55.1	28.2	50.81	47.0	28.7	13.76	28.2	28.7	84.64	44.3
28.9	52.69	54.8	29.2	50.46	46.9	29.6	14.03	28.4	29.7	85.68	44.4
29.9	53.01	54.6	30.2	50.09	46.8	30.6	14.32	28.6	30.7	86.79	44.6
30.9	53.36	54.3	31.2	49.71	46.6	31.6	14.59	28.8	31.7	87.92	44.7
31.9	53.78	54.0									

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
May	<sup>h</sup> 1 <sup>m</sup> 20	+88° 45'	May	<sup>h</sup> 6 <sup>m</sup> 52	+87° 12'	May	<sup>h</sup> 18 <sup>m</sup> 5	+86° 36'	May	<sup>h</sup> 19 <sup>m</sup> 24	+88° 58'
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.9	53.78	54.0	1.2	49.71	46.6	1.6	14.59	28.8	1.7	27.92	44.7
2.9	54.27	53.7	2.2	49.32	46.4	2.6	14.85	29.1	2.7	29.06	44.8
3.9	54.82	53.4	3.2	48.93	46.2	3.6	15.13	29.3	3.7	30.21	45.0
4.9	55.44	53.1	4.2	48.58	46.0	4.6	15.37	29.6	4.7	31.30	45.2
5.9	56.09	52.8	5.2	48.24	45.8	5.6	15.60	29.9	5.7	32.35	45.4
6.9	56.78	52.6	6.2	47.93	45.6	6.6	15.80	30.2	6.7	33.32	45.6
7.9	57.47	52.4	7.1	47.64	45.3	7.6	15.98	30.5	7.7	34.20	45.8
8.9	58.12	52.2	8.1	47.40	45.1	8.6	16.15	30.8	8.6	35.04	46.0
9.9	58.74	52.0	9.1	47.16	44.8	9.6	16.31	31.0	9.6	35.84	46.2
10.9	59.31	51.8	10.1	46.92	44.6	10.6	16.47	31.3	10.6	36.63	46.4
11.9	59.85	51.5	11.1	46.69	44.4	11.6	16.64	31.5	11.6	37.43	46.6
12.9	60.38	51.3	12.1	46.45	44.3	12.6	16.83	31.8	12.6	38.25	46.7
13.9	60.93	51.1	13.1	46.18	44.1	13.6	17.03	32.0	13.6	39.14	46.9
14.9	61.51	50.8	14.1	45.88	43.9	14.6	17.21	32.2	14.6	40.07	47.1
15.9	62.14	50.6	15.1	45.58	43.7	15.6	17.43	32.5	15.6	41.04	47.3
16.9	62.85	50.3	16.1	45.27	43.4	16.6	17.62	32.8	16.6	42.02	47.5
17.9	63.62	50.1	17.1	44.95	43.2	17.6	17.82	33.1	17.6	43.00	47.7
18.9	64.44	49.8	18.1	44.66	42.9	18.6	17.99	33.5	18.6	43.93	48.0
19.9	65.31	49.6	19.1	44.40	42.6	19.6	18.14	33.8	19.6	44.79	48.3
20.9	66.16	49.4	20.1	44.17	42.3	20.6	18.26	34.1	20.6	45.58	48.5
21.9	67.01	49.3	21.1	43.96	42.0	21.6	18.37	34.5	21.6	46.30	48.8
22.9	67.82	49.1	22.1	43.79	41.7	22.6	18.47	34.8	22.6	46.96	49.1
23.9	68.60	48.9	23.1	43.63	41.5	23.6	18.56	35.1	23.6	47.58	49.3
24.9	69.33	48.8	24.1	43.46	41.2	24.6	18.65	35.4	24.6	48.19	49.6
25.9	70.03	48.6	25.1	43.30	41.0	25.6	18.75	35.6	25.6	48.81	49.8
26.9	70.73	48.4	26.1	43.13	40.7	26.6	18.86	35.9	26.6	49.48	50.0
27.9	71.45	48.3	27.1	42.93	40.5	27.6	18.98	36.2	27.6	50.18	50.2
28.9	72.22	48.1	28.1	42.72	40.3	28.6	19.11	36.5	28.6	50.91	50.5
29.9	73.04	47.9	29.1	42.50	40.0	29.6	19.22	36.8	29.6	51.66	50.7
30.9	73.93	47.7	30.1	42.28	39.7	30.6	19.33	37.1	30.6	52.39	51.0
31.9	74.88	47.5	31.1	42.09	39.4	31.6	19.43	37.5	31.6	53.10	51.3
32.9	75.86	47.4	32.1	41.91	39.1	32.6	19.51	37.8	32.6	53.75	51.6

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hrv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
June	<sup>h</sup> <sup>m</sup> 1 21	+88 45	June	<sup>h</sup> <sup>m</sup> 6 52	+87 12	June	<sup>h</sup> <sup>m</sup> 18 5	+86 36	June	<sup>h</sup> <sup>m</sup> 19 24	+88 58
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.9	15.86	47.4	1.1	41.91	39.1	1.6	19.51	37.8	1.6	53.75	51.6
2.9	16.88	47.2	2.1	41.77	38.7	2.6	19.55	38.2	2.6	54.31	51.9
3.8	17.88	47.1	3.1	41.66	38.4	3.5	19.58	38.5	3.6	54.81	52.3
4.8	18.90	47.0	4.1	41.58	38.1	4.5	19.58	38.9	4.6	55.23	52.6
5.8	19.86	46.9	5.1	41.52	37.8	5.5	19.57	39.2	5.6	55.58	52.9
6.8	20.75	46.9	6.1	41.47	37.5	6.5	19.57	39.5	6.6	55.92	53.2
7.8	21.62	46.8	7.1	41.44	37.2	7.5	19.57	39.8	7.6	56.24	53.5
8.8	22.46	46.7	8.1	41.38	36.9	8.5	19.58	40.1	8.6	56.61	53.7
9.8	23.29	46.6	9.1	41.30	36.7	9.5	19.60	40.4	9.6	57.01	54.0
10.8	24.14	46.5	10.1	41.23	36.4	10.5	19.62	40.7	10.6	57.44	54.3
11.8	25.03	46.4	11.1	41.11	36.1	11.5	19.66	41.0	11.6	57.92	54.6
12.8	25.99	46.2	12.1	40.98	35.8	12.5	19.68	41.3	12.6	58.42	54.9
13.8	27.00	46.1	13.0	40.88	35.5	13.5	19.71	41.7	13.6	58.91	55.2
14.8	28.06	46.0	14.0	40.77	35.1	14.5	19.71	42.1	14.6	59.35	55.5
15.8	29.15	45.9	15.0	40.71	34.8	15.5	19.70	42.4	15.6	59.75	55.9
16.8	30.26	45.8	16.0	40.66	34.4	16.5	19.66	42.8	16.6	60.06	56.2
17.8	31.35	45.8	17.0	40.65	34.1	17.5	19.61	43.1	17.6	60.29	56.6
18.8	32.40	45.8	18.0	40.67	33.7	18.5	19.53	43.5	18.6	60.47	56.9
19.8	33.41	45.8	19.0	40.71	33.4	19.5	19.45	43.8	19.6	60.58	57.3
20.8	34.38	45.7	20.0	40.76	33.1	20.5	19.36	44.1	20.6	60.67	57.6
21.8	35.31	45.7	21.0	40.79	32.8	21.5	19.30	44.4	21.6	60.77	57.9
22.8	36.19	45.7	22.0	40.83	32.5	22.5	19.23	44.7	22.6	60.89	58.2
23.8	37.09	45.7	23.0	40.86	32.2	23.5	19.16	45.0	23.6	61.02	58.5
24.8	38.03	45.6	24.0	40.87	32.0	24.5	19.12	45.3	24.6	61.22	58.8
25.8	39.00	45.6	25.0	40.85	31.7	25.5	19.07	45.6	25.6	61.42	59.1
26.8	40.03	45.6	26.0	40.84	31.3	26.5	19.00	46.0	26.6	61.63	59.4
27.8	41.12	45.5	27.0	40.84	31.0	27.5	18.93	46.3	27.6	61.82	59.7
28.8	42.28	45.5	28.0	40.87	30.6	28.5	18.84	46.7	28.6	61.95	60.1
29.8	43.43	45.5	29.0	40.92	30.3	29.5	18.73	47.0	29.5	62.01	60.5
30.8	44.60	45.5	30.0	41.00	29.9	30.5	18.58	47.4	30.5	61.97	60.9
31.8	45.75	45.6	31.0	41.12	29.6	31.5	18.41	47.7	31.5	61.87	61.2

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hrv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
July	<sup>h</sup> 1 <sup>m</sup> 21	<sup>°</sup> +88 <sup>'</sup> 45	July	<sup>h</sup> 6 <sup>m</sup> 52	<sup>°</sup> +87 <sup>'</sup> 12	July	<sup>h</sup> 18 <sup>m</sup> 5	<sup>°</sup> +86 <sup>'</sup> 36	July	<sup>h</sup> 19 <sup>m</sup> 24	<sup>°</sup> +88 <sup>'</sup> 59
	<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>
1.8	45.75	45.6	1.0	41.12	29.6	1.5	18.41	47.7	1.5	61.87	1.2
2.8	46.84	45.6	2.0	41.27	29.2	2.5	18.24	48.0	2.5	61.71	1.6
3.8	47.90	45.7	3.0	41.43	28.9	3.5	18.05	48.3	3.5	61.48	1.9
4.8	48.89	45.8	3.9	41.59	28.6	4.5	17.89	48.6	4.5	61.26	2.3
5.8	49.83	45.9	4.9	41.75	28.3	5.5	17.71	48.9	5.5	61.03	2.6
6.8	50.77	45.9	5.9	41.90	28.0	6.5	17.55	49.2	6.5	60.86	2.9
7.8	51.71	45.9	6.9	42.03	27.7	7.5	17.41	49.5	7.5	60.71	3.2
8.8	52.66	46.0	7.9	42.13	27.4	8.5	17.26	49.7	8.5	60.62	3.5
9.8	53.68	46.0	8.9	42.23	27.1	9.5	17.12	50.0	9.5	60.54	3.8
10.7	54.74	46.0	9.9	42.32	26.8	10.5	16.98	50.3	10.5	60.47	4.1
11.7	55.85	46.0	10.9	42.44	26.5	11.5	16.83	50.7	11.5	60.37	4.5
12.7	56.98	46.1	11.9	42.55	26.1	12.4	16.65	51.0	12.5	60.23	4.9
13.7	58.14	46.2	12.9	42.70	25.8	13.4	16.44	51.3	13.5	59.99	5.2
14.7	59.28	46.3	13.9	42.89	25.4	14.4	16.23	51.7	14.5	59.70	5.6
15.7	60.40	46.4	14.9	43.10	25.1	15.4	16.00	52.0	15.5	59.32	6.0
16.7	61.47	46.5	15.9	43.32	24.7	16.4	15.75	52.3	16.5	58.90	6.3
17.7	62.47	46.6	16.9	43.57	24.4	17.4	15.50	52.6	17.5	58.43	6.7
18.7	63.43	46.8	17.9	43.82	24.1	18.4	15.26	52.8	18.5	57.96	7.0
19.7	64.35	46.9	18.9	44.06	23.9	19.4	15.02	53.1	19.5	57.50	7.3
20.7	65.26	47.0	19.9	44.29	23.6	20.4	14.78	53.3	20.5	57.09	7.6
21.7	66.17	47.1	20.9	44.51	23.4	21.4	14.58	53.6	21.5	56.68	7.9
22.7	67.12	47.2	21.9	44.69	23.1	22.4	14.37	53.8	22.5	56.33	8.2
23.7	68.11	47.3	22.9	44.88	22.8	23.4	14.15	54.1	23.5	55.98	8.5
24.7	69.17	47.5	23.9	45.07	22.5	24.4	13.92	54.4	24.5	55.61	8.8
25.7	70.27	47.6	24.9	45.29	22.2	25.4	13.68	54.7	25.5	55.21	9.2
26.7	71.40	47.7	25.9	45.52	21.8	26.4	13.42	55.0	26.5	54.75	9.5
27.7	72.52	47.9	26.9	45.79	21.5	27.4	13.13	55.3	27.5	54.20	9.9
28.7	73.64	48.1	27.9	46.09	21.2	28.4	12.83	55.6	28.5	53.57	10.3
29.7	74.71	48.3	28.9	46.42	20.8	29.4	12.50	55.9	29.5	52.86	10.6
30.7	75.70	48.5	29.9	46.77	20.5	30.4	12.18	56.1	30.5	52.11	11.0
31.7	76.66	48.7	30.9	47.13	20.3	31.4	11.85	56.3	31.5	51.33	11.3
32.7	77.57	48.9	31.9	47.49	20.0	32.4	11.52	56.5	32.5	50.56	11.6

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Her.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
Aug.	<sup>h</sup> <sup>m</sup> 1 22	+88 45	Aug.	<sup>h</sup> <sup>m</sup> 6 52	+87 12	Aug.	<sup>h</sup> <sup>m</sup> 18 5	+86 36	Aug.	<sup>h</sup> <sup>m</sup> 19 24	+88 59
	<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"		<sup>s</sup>	"
1.7	17.57	48.9	1.9	47.83	19.7	1.4	11.52	56.3	1.5	50.56	11.6
2.7	18.42	49.1	2.9	48.15	19.5	2.4	11.22	56.7	2.4	49.82	11.8
3.7	19.27	49.3	3.9	48.46	19.3	3.4	10.91	56.9	3.4	49.13	12.1
4.7	20.14	49.5	4.9	48.74	19.0	4.4	10.64	57.1	4.4	48.47	12.4
5.7	21.04	49.6	5.9	49.01	18.8	5.4	10.35	57.4	5.4	47.85	12.7
6.7	21.98	49.8	6.9	49.30	18.5	6.4	10.07	57.6	6.4	47.24	13.0
7.7	22.97	50.0	7.9	49.58	18.2	7.4	9.78	57.8	7.4	46.63	13.3
8.7	23.99	50.2	8.9	49.91	17.9	8.4	9.48	58.1	8.4	45.98	13.6
9.7	25.02	50.4	9.9	50.24	17.6	9.4	9.14	58.3	9.4	45.27	14.0
10.7	26.06	50.6	10.9	50.63	17.3	10.4	8.80	58.6	10.4	44.49	14.3
11.7	27.06	50.8	11.9	51.02	17.0	11.4	8.43	58.8	11.4	43.61	14.6
12.7	28.00	51.1	12.9	51.43	16.7	12.4	8.06	59.0	12.4	42.69	14.9
13.7	28.90	51.3	13.9	51.85	16.5	13.4	7.69	59.2	13.4	41.75	15.2
14.7	29.72	51.6	14.9	52.26	16.3	14.4	7.32	59.4	14.4	40.76	15.5
15.6	30.49	51.9	15.9	52.66	16.1	15.4	6.96	59.6	15.4	39.79	15.8
16.6	31.25	52.1	16.9	53.04	15.9	16.3	6.60	59.7	16.4	38.85	16.0
17.6	31.98	52.4	17.9	53.41	15.7	17.3	6.26	59.9	17.4	37.96	16.2
18.6	32.75	52.6	18.9	53.74	15.5	18.3	5.92	60.0	18.4	37.11	16.5
19.6	33.56	52.8	19.9	54.10	15.2	19.3	5.59	60.2	19.4	36.27	16.8
20.6	34.40	53.0	20.9	54.47	15.0	20.3	5.26	60.4	20.4	35.43	17.0
21.6	35.29	53.3	21.9	54.83	14.8	21.3	4.91	60.6	21.4	34.57	17.3
22.6	36.20	53.5	22.9	55.25	14.5	22.3	4.55	60.8	22.4	33.66	17.6
23.6	37.14	53.8	23.9	55.68	14.2	23.3	4.17	61.0	23.4	32.68	17.9
24.6	38.06	54.1	24.8	56.16	14.0	24.3	3.75	61.1	24.4	31.62	18.2
25.6	38.94	54.4	25.8	56.65	13.8	25.3	3.34	61.3	25.4	30.48	18.5
26.6	39.77	54.7	26.8	57.14	13.6	26.3	2.90	61.5	26.4	29.29	18.8
27.6	40.53	55.1	27.8	57.64	13.4	27.3	2.47	61.6	27.4	28.07	19.0
28.6	41.21	55.4	28.8	58.14	13.2	28.3	2.05	61.7	28.4	26.84	19.3
29.6	41.86	55.7	29.8	58.60	13.0	29.3	1.63	61.8	29.4	25.64	19.5
30.6	42.49	56.0	30.8	59.05	12.9	30.3	1.24	61.9	30.4	24.49	19.7
31.6	43.10	56.3	31.8	59.49	12.7	31.3	0.85	62.0	31.4	23.38	19.9
32.6	43.74	56.6	32.8	59.90	12.6	32.3	0.48	62.1	32.4	22.32	20.1

## CIRCUMPOLAR STARS.

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\epsilon$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hæv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Sept.	h m	°	Sept.	h m	°	Sept.	h m	°	Sept.	h m	°
	1 22	+88 45		6 52	+87 12		18 4	+86 37		19 23	+88 59
1.6	43.74	56.6	1.8	59.90	12.6	1.3	60.48	2.1	1.4	82.32	20.1
2.6	44.41	56.8	2.8	60.30	12.4	2.3	60.10	2.2	2.4	81.29	20.3
3.6	45.13	57.1	3.8	60.71	12.2	3.3	59.74	2.3	3.4	80.26	20.5
4.6	45.90	57.4	4.8	61.14	12.0	4.3	59.36	2.5	4.4	79.21	20.8
5.6	46.67	57.7	5.8	61.61	11.8	5.3	58.95	2.6	5.4	78.12	21.0
6.6	47.45	58.0	6.8	62.09	11.6	6.3	58.53	2.8	6.4	76.96	21.3
7.6	48.21	58.4	7.8	62.61	11.4	7.3	58.11	2.9	7.4	75.74	21.5
8.6	48.91	58.7	8.8	63.13	11.2	8.3	57.66	3.0	8.4	74.44	21.7
9.6	49.55	59.1	9.8	63.66	11.1	9.3	57.22	3.1	9.4	73.09	22.0
10.6	50.12	59.4	10.8	64.19	10.9	10.3	56.77	3.1	10.3	71.76	22.2
11.6	50.64	59.8	11.8	64.71	10.8	11.3	56.33	3.2	11.3	70.41	22.3
12.6	51.11	60.1	12.8	65.20	10.7	12.3	55.91	3.2	12.3	69.09	22.5
13.6	51.58	60.5	13.8	65.68	10.6	13.3	55.50	3.2	13.3	67.82	22.6
14.6	52.02	60.8	14.8	66.14	10.5	14.3	55.10	3.2	14.3	66.61	22.8
15.6	52.52	61.1	15.8	66.58	10.4	15.3	54.71	3.3	15.3	65.42	22.9
16.6	53.05	61.4	16.8	67.02	10.3	16.3	54.32	3.3	16.3	64.25	23.1
17.6	53.62	61.7	17.8	67.49	10.2	17.3	53.92	3.4	17.3	63.07	23.3
18.6	54.22	62.1	18.8	67.99	10.0	18.3	53.49	3.5	18.3	61.85	23.5
19.6	54.84	62.4	19.8	68.50	9.8	19.3	53.08	3.5	19.3	60.57	23.7
20.6	55.45	62.8	20.8	69.04	9.7	20.3	52.64	3.6	20.3	59.24	23.8
21.5	56.03	63.2	21.8	69.62	9.6	21.3	52.16	3.7	21.3	57.82	24.0
22.5	56.56	63.6	22.8	70.20	9.5	22.2	51.70	3.7	22.3	56.35	24.2
23.5	57.01	64.0	23.8	70.76	9.4	23.2	51.22	3.7	23.3	54.84	24.4
24.5	57.40	64.4	24.8	71.34	9.3	24.2	50.74	3.7	24.3	53.33	24.5
25.5	57.74	64.7	25.8	71.90	9.3	25.2	50.28	3.6	25.3	51.84	24.6
26.5	58.03	65.1	26.8	72.44	9.2	26.2	49.84	3.6	26.3	50.38	24.7
27.5	58.30	65.5	27.8	72.93	9.2	27.2	49.43	3.6	27.3	48.99	24.8
28.5	58.58	65.8	28.8	73.42	9.1	28.2	49.02	3.5	28.3	47.66	24.9
29.5	58.88	66.2	29.8	73.89	9.1	29.2	48.61	3.5	29.3	46.37	25.0
30.5	59.23	66.5	30.8	74.37	9.0	30.2	48.21	3.5	30.3	45.09	25.1
31.5	59.62	66.8	31.7	74.86	8.9	31.2	47.83	3.5	31.3	43.82	25.2

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	51 Cephei (Hrv.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.		Right Ascen- sion.	Declina- tion North.
Oct.	<sup>h</sup> <sup>m</sup> 1 22	+88 46	Oct.	<sup>h</sup> <sup>m</sup> 6 53	+87 12	Oct.	<sup>h</sup> <sup>m</sup> 18 4	+86 37	Oct.	<sup>h</sup> <sup>m</sup> 19 23	+88 59
	<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>		<sup>s</sup>	<sup>"</sup>
1.5	59.62	6.8	1.7	14.86	8.9	1.2	47.83	3.5	1.3	43.82	25.2
2.5	60.03	7.2	2.7	15.36	8.8	2.2	47.42	3.5	2.3	42.52	25.3
3.5	60.45	7.6	3.7	15.88	8.8	3.2	46.99	3.5	3.3	41.17	25.5
4.5	60.84	7.9	4.7	16.44	8.7	4.2	46.55	3.5	4.3	39.76	25.6
5.5	61.19	8.3	5.7	17.01	8.6	5.2	46.10	3.5	5.3	38.27	25.7
6.5	61.48	8.7	6.7	17.59	8.6	6.2	45.65	3.4	6.3	36.75	25.8
7.5	61.71	9.2	7.7	18.16	8.6	7.2	45.18	3.4	7.3	35.22	25.9
8.5	61.87	9.6	8.7	18.72	8.6	8.2	44.74	3.3	8.3	33.68	26.0
9.5	61.96	10.0	9.7	19.26	8.6	9.2	44.30	3.2	9.3	32.18	26.0
10.5	62.04	10.3	10.7	19.77	8.6	10.2	43.90	3.1	10.3	30.72	26.0
11.5	62.09	10.7	11.7	20.28	8.7	11.2	43.49	3.0	11.3	29.32	26.0
12.5	62.18	11.1	12.7	20.75	8.7	12.2	43.09	2.9	12.3	27.96	26.0
13.5	62.29	11.4	13.7	21.22	8.7	13.2	42.72	2.8	13.3	26.65	26.1
14.5	62.46	11.8	14.7	21.71	8.7	14.2	42.34	2.7	14.3	25.34	26.1
15.5	62.65	12.1	15.7	22.20	8.7	15.2	41.94	2.6	15.3	24.01	26.2
16.5	62.85	12.5	16.7	22.74	8.6	16.2	41.54	2.6	16.2	22.65	26.2
17.5	63.06	12.9	17.7	23.28	8.6	17.2	41.12	2.5	17.2	21.20	26.3
18.5	63.25	13.3	18.7	23.86	8.6	18.2	40.69	2.4	18.2	19.72	26.4
19.5	63.41	13.7	19.7	24.44	8.6	19.2	40.24	2.3	19.2	18.18	26.4
20.5	63.47	14.1	20.7	25.03	8.7	20.2	39.79	2.2	20.2	16.60	26.4
21.5	63.48	14.5	21.7	25.62	8.7	21.2	39.36	2.1	21.2	15.01	26.4
22.5	63.40	14.9	22.7	26.19	8.8	22.2	38.94	1.9	22.2	13.43	26.4
23.5	63.30	15.3	23.7	26.71	8.9	23.2	38.52	1.7	23.2	11.91	26.4
24.5	63.17	15.7	24.7	27.23	9.0	24.2	38.14	1.6	24.2	10.44	26.3
25.5	63.02	16.1	25.7	27.72	9.1	25.2	37.77	1.4	25.2	9.04	26.3
26.5	62.89	16.4	26.7	28.18	9.2	26.2	37.41	1.2	26.2	7.69	26.3
27.5	62.81	16.8	27.7	28.64	9.2	27.2	37.05	1.0	27.2	6.40	26.2
28.4	62.76	17.1	28.7	29.10	9.3	28.1	36.71	0.9	28.2	5.11	26.2
29.4	62.75	17.4	29.7	29.57	9.3	29.1	36.35	0.8	29.2	3.80	26.2
30.4	62.74	17.8	30.7	30.08	9.4	30.1	35.99	0.7	30.2	2.47	26.2
31.4	62.71	18.2	31.7	30.59	9.4	31.1	35.61	0.5	31.2	1.10	26.1
32.4	62.67	18.6	32.7	31.13	9.5	32.1	35.22	0.4			

## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Minoris. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hav.)		Mean Solar Date.	$\delta$ Ursæ Minoris.		Mean Solar Date.	$\lambda$ Ursæ Minoris.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
Nov.	h m	+88 46	Nov.	h m	+87 12	Nov.	h m	+86 36	Nov.	h m	+88 59
	s	"		s	"		s	"		s	"
1.4	62.67	18.6	1.7	31.13	9.5	1.1	35.22	60.4	1.2	59.67	26.1
2.4	62.55	19.0	2.7	31.67	9.6	2.1	34.82	60.2	2.2	58.19	26.1
3.4	62.37	19.4	3.7	32.22	9.7	3.1	34.43	60.0	3.2	56.70	26.0
4.4	62.13	19.8	4.7	32.74	9.8	4.1	34.04	59.8	4.2	55.22	26.0
5.4	61.81	20.1	5.7	33.25	10.0	5.1	33.68	59.6	5.2	53.76	25.9
6.4	61.45	20.5	6.6	33.72	10.2	6.1	33.34	59.3	6.2	52.33	25.8
7.4	61.08	20.8	7.6	34.19	10.3	7.1	33.00	59.1	7.2	50.99	25.6
8.4	60.71	21.2	8.6	34.62	10.5	8.1	32.69	58.9	8.2	49.71	25.5
9.4	60.38	21.5	9.6	35.03	10.6	9.1	32.40	58.6	9.2	48.48	25.4
10.4	60.08	21.8	10.6	35.44	10.8	10.1	32.10	58.4	10.2	47.29	25.3
11.4	59.82	22.1	11.6	35.86	10.9	11.1	31.81	58.2	11.2	46.07	25.2
12.4	59.59	22.5	12.6	36.32	11.0	12.1	31.50	58.0	12.2	44.87	25.1
13.4	59.36	22.8	13.6	36.78	11.1	13.1	31.18	57.9	13.2	43.60	25.0
14.4	59.12	23.2	14.6	37.27	11.2	14.1	30.85	57.7	14.2	42.28	25.0
15.4	58.85	23.5	15.6	37.78	11.4	15.1	30.50	57.4	15.2	40.91	24.9
16.4	58.50	23.9	16.6	38.29	11.5	16.1	30.17	57.2	16.2	39.50	24.8
17.4	58.11	24.3	17.6	38.78	11.7	17.1	29.82	57.0	17.2	38.08	24.6
18.4	57.64	24.6	18.6	39.27	11.9	18.1	29.49	56.7	18.2	36.68	24.5
19.4	57.09	25.0	19.6	39.72	12.1	19.1	29.18	56.4	19.2	35.32	24.3
20.4	56.54	25.3	20.6	40.16	12.3	20.1	28.89	56.1	20.2	34.04	24.1
21.4	55.96	25.6	21.6	40.54	12.5	21.1	28.64	55.8	21.2	32.82	23.9
22.4	55.39	25.9	22.6	40.93	12.7	22.1	28.40	55.5	22.2	31.69	23.7
23.4	54.86	26.2	23.6	41.28	12.9	23.1	28.17	55.3	23.2	30.59	23.6
24.4	54.36	26.5	24.6	41.64	13.1	24.1	27.94	55.0	24.2	29.55	23.4
25.4	53.90	26.8	25.6	42.00	13.3	25.1	27.72	54.8	25.2	28.51	23.2
26.4	53.44	27.0	26.6	42.38	13.5	26.1	27.48	54.5	26.2	27.46	23.1
27.4	53.01	27.3	27.6	42.78	13.6	27.1	27.23	54.3	27.2	26.36	22.9
28.4	52.54	27.6	28.6	43.18	13.8	28.1	26.97	54.0	28.2	25.24	22.8
29.4	52.03	28.0	29.6	43.60	14.0	29.1	26.72	53.8	29.2	24.07	22.6
30.4	51.47	28.3	30.6	44.02	14.3	30.1	26.48	53.5	30.2	22.88	22.4
31.4	50.81	28.6	31.6	44.42	14.5	31.1	26.22	53.2	31.2	21.69	22.2



## CIRCUMPOLAR STARS.

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\epsilon$ Ursæ Minoria. (Polaris.)		Mean Solar Date.	$\gamma$ Cephei (Hrv.)		Mean Solar Date.	$\delta$ Ursæ Minoria.		Mean Solar Date.	$\lambda$ Ursæ Minoria.	
	Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.		Right Ascension.	Declina- tion North.
Dec.	<sup>h</sup> <sup>m</sup> 1 22	+88 46	Dec.	<sup>h</sup> <sup>m</sup> 6 53	+87 12	Dec.	<sup>h</sup> <sup>m</sup> 18 4	+86 36	Dec.	<sup>h</sup> <sup>m</sup> 19 21	+88 59
	<sup>s</sup>	<sup>s</sup>		<sup>s</sup>	<sup>s</sup>		<sup>s</sup>	<sup>s</sup>		<sup>s</sup>	<sup>s</sup>
1.4	50.81	28.6	1.6	44.42	14.5	1.1	26.22	53.2	1.1	81.69	22.2
2.4	50.10	28.9	2.6	44.79	14.8	2.1	26.00	52.9	2.1	80.53	22.0
3.3	49.34	29.2	3.6	45.16	15.1	3.1	25.77	52.5	3.1	79.43	21.8
4.3	48.56	29.4	4.6	45.48	15.3	4.0	25.59	52.2	4.1	78.40	21.5
5.3	47.78	29.7	5.6	45.77	15.6	5.0	25.42	51.8	5.1	77.44	21.2
6.3	47.02	29.9	6.6	46.05	15.9	6.0	25.26	51.5	6.1	76.53	21.0
7.3	46.29	30.1	7.6	46.31	16.1	7.0	25.13	51.2	7.1	75.70	20.7
8.3	45.63	30.3	8.6	46.58	16.4	8.0	24.99	50.9	8.1	74.88	20.5
9.3	44.99	30.6	9.6	46.86	16.6	9.0	24.83	50.6	9.1	74.04	20.3
10.3	44.37	30.8	10.6	47.16	16.8	10.0	24.68	50.4	10.1	73.20	20.1
11.3	43.76	31.0	11.6	47.48	17.0	11.0	24.51	50.1	11.1	72.30	19.9
12.3	43.12	31.3	12.5	47.80	17.3	12.0	24.34	49.8	12.1	71.37	19.7
13.3	42.42	31.6	13.5	48.14	17.5	13.0	24.16	49.5	13.1	70.39	19.4
14.3	41.67	31.8	14.5	48.47	17.8	14.0	23.98	49.2	14.1	69.41	19.2
15.3	40.84	32.1	15.5	48.80	18.1	15.0	23.82	48.8	15.1	68.43	18.9
16.3	39.98	32.3	16.5	49.08	18.4	16.0	23.67	48.5	16.1	67.51	18.6
17.3	39.05	32.6	17.5	49.33	18.8	17.0	23.53	48.1	17.1	66.65	18.3
18.3	38.11	32.8	18.5	49.57	19.1	18.0	23.45	47.7	18.1	65.87	18.1
19.3	37.20	32.9	19.5	49.77	19.4	19.0	23.38	47.4	19.1	65.17	17.8
20.3	36.30	33.1	20.5	49.93	19.7	20.0	23.31	47.0	20.1	64.55	17.5
21.3	35.46	33.2	21.5	50.09	20.0	21.0	23.26	46.7	21.1	63.97	17.2
22.3	34.65	33.4	22.5	50.25	20.2	22.0	23.23	46.4	22.1	63.44	16.9
23.3	33.87	33.5	23.5	50.42	20.5	23.0	23.17	46.1	23.1	62.90	16.6
24.3	33.11	33.7	24.5	50.61	20.7	24.0	23.11	45.8	24.1	62.33	16.4
25.3	32.33	33.8	25.5	50.81	21.0	25.0	23.03	45.5	25.1	61.74	16.1
26.3	31.55	34.0	26.5	51.03	21.3	26.0	22.98	45.2	26.0	61.11	15.9
27.3	30.68	34.2	27.5	51.24	21.6	27.0	22.89	44.9	27.0	60.46	15.6
28.3	29.76	34.3	28.5	51.43	21.9	28.0	22.85	44.6	28.0	59.82	15.3
29.3	28.80	34.5	29.5	51.62	22.2	29.0	22.79	44.2	29.0	59.20	15.0
30.3	27.77	34.7	30.5	51.76	22.5	30.0	22.76	43.8	30.0	58.64	14.7
31.3	26.71	34.8	31.5	51.89	22.9	31.0	22.77	43.5	31.0	58.13	14.3
32.3	25.66	34.9	32.5	51.97	23.2	32.0	22.78	43.1	32.0	57.71	14.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Andromeda.		$\gamma$ Pegasi. (Algenib.)		$\beta$ Hydri.		$\iota_2$ Ceti.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 0 3	° ' " +28 31	h m 0 7	° ' " +14 37	h m 0 20	° ' " -77 49	h m 0 24	° ' " - 4 30
(Dec. 30.2)	7.45 -13	52.8 -0.8	59.68 -11	9.3 -0.7	24.88 -94	57.2 +1.0	50.88 -11	71.4 -0.6
Jan. 9.2	7.32 .13	51.9 1.0	59.56 .11	8.5 0.9	23.96 .89	56.2 1.4	50.77 .11	72.0 0.5
19.2	7.19 .12	50.8 1.2	59.46 .10	7.6 1.0	23.10 .82	54.5 1.9	50.67 .10	72.5 0.4
29.1	7.08 .10	49.4 1.4	59.37 .09	6.6 1.0	22.32 .73	52.3 2.4	50.57 .09	72.9 0.3
Feb. 8.1	6.99 .08	47.9 1.5	59.29 .07	5.6 1.0	21.64 .62	49.7 2.9	50.49 .08	73.1 -0.1
18.1	6.92 -0.5	46.3 -1.6	59.23 -0.4	4.6 -1.0	21.08 -99	46.6 +3.2	50.42 -0.6	73.2 0.0
28.1	6.88 -0.08	44.7 1.6	59.20 -0.02	3.7 0.9	20.66 .35	43.2 3.5	50.38 -0.5	73.1 +0.2
Mar. 10.0	6.88 +0.02	43.2 1.5	59.20 +0.02	2.9 0.7	20.38 .20	39.6 3.7	50.36 .00	72.8 0.4
20.0	6.92 .06	41.8 1.3	59.24 .05	2.3 0.5	20.25 -0.5	35.8 3.8	50.38 +0.4	72.2 0.7
30.0	7.00 .11	40.6 1.0	59.31 .09	1.9 -0.2	20.28 +.11	31.9 3.9	50.44 .07	71.4 0.9
Apr. 9.0	7.13 +1.15	39.7 -0.7	59.43 +1.14	1.8 0.0	20.47 +.26	28.1 +3.8	50.53 +1.11	70.4 +1.1
19.0	7.31 .20	39.1 -0.4	59.58 .18	2.0 +0.4	20.81 .41	24.3 3.7	50.66 .15	69.1 1.4
28.9	7.53 .24	39.0 0.0	59.78 .22	2.5 0.7	21.29 .56	20.7 3.5	50.84 .19	67.6 1.6
May 8.9	7.79 .28	39.1 +0.4	60.02 .25	3.4 1.0	21.93 .70	17.4 3.2	51.05 .23	65.9 1.8
18.9	8.09 .31	39.7 0.7	60.29 .28	4.5 1.3	22.69 .82	14.3 2.8	51.30 .26	64.0 1.9
28.8	8.41 +3.33	40.7 +1.1	60.58 +3.30	5.9 +1.5	23.56 +.92	11.7 +2.4	51.57 +3.29	62.1 +2.0
June 7.8	8.75 .34	42.0 1.5	60.90 .32	7.6 1.8	24.52 1.00	9.5 2.0	51.87 .31	60.0 2.1
17.8	9.10 .35	43.7 1.8	61.22 .33	9.5 1.9	25.55 1.05	7.8 1.5	52.18 .32	57.9 2.1
27.7	9.45 .35	45.6 2.1	61.55 .32	11.5 2.1	26.62 1.08	6.6 0.9	52.50 .32	55.8 2.0
July 7.7	9.79 .33	47.8 2.3	61.87 .31	13.6 2.2	27.71 1.07	6.0 +0.3	52.81 .31	53.8 1.9
17.7	10.11 +3.31	50.2 +2.4	62.18 +3.30	15.8 +2.2	28.77 +1.04	6.0 -0.3	53.12 +3.30	52.0 +1.8
27.7	10.42 .29	52.6 2.5	62.46 .27	18.0 2.1	29.79 .98	6.6 0.8	53.41 .28	50.3 1.6
Aug. 6.6	10.69 .25	55.1 2.5	62.72 .24	20.1 2.1	30.73 .88	7.7 1.4	53.68 .25	48.8 1.4
16.6	10.92 .22	57.7 2.5	62.95 .21	22.1 2.0	31.55 .76	9.3 1.9	53.91 .22	47.6 1.1
26.6	11.12 .18	60.2 2.4	63.14 .17	24.0 1.8	32.25 .63	11.4 2.3	54.11 .18	46.6 0.8
Sept. 5.6	11.27 +1.14	62.6 +2.3	63.29 +1.13	25.8 +1.6	32.78 +.44	13.8 -2.6	54.28 +1.15	45.9 +0.5
15.5	11.39 .09	64.8 2.2	63.40 .10	27.3 1.4	33.14 .27	16.6 2.9	54.41 .11	45.5 +0.3
25.5	11.46 .06	66.9 2.0	63.48 .06	28.6 1.2	33.31 +.08	19.6 3.0	54.50 .07	45.3 0.0
Oct. 5.5	11.50 +0.02	68.8 1.8	63.52 +0.02	29.6 1.0	33.30 -0.11	22.7 3.0	54.55 .04	45.4 -0.2
15.5	11.50 -0.02	70.4 1.5	63.53 -0.01	30.5 0.7	33.10 .29	25.7 2.9	54.58 +0.01	45.7 0.4
25.4	11.47 -0.04	71.8 +1.3	63.51 -0.03	31.1 +0.5	32.71 -0.47	28.6 -2.7	54.57 -0.02	46.2 -0.6
Nov. 4.4	11.41 .07	72.9 1.0	63.46 .06	31.5 0.3	32.16 .62	31.1 2.4	54.53 .04	46.8 0.7
14.4	11.33 .09	73.7 0.7	63.40 .08	31.7 +0.1	31.48 .74	33.3 2.0	54.48 .06	47.5 0.7
24.3	11.23 .11	74.2 +0.3	63.31 .09	31.7 -0.1	30.67 .84	35.0 1.5	54.40 .08	48.3 0.8
Dec. 4.3	11.11 .12	74.4 0.0	63.22 .10	31.5 0.3	29.79 .91	36.2 0.9	54.32 .09	49.1 0.8
14.3	10.99 -1.13	74.3 -0.5	63.11 -1.11	31.0 -0.5	28.85 -95	36.8 -0.3	54.22 -1.10	49.9 -0.8
24.3	10.85 .15	73.8 0.6	63.00 .11	30.4 0.7	27.89 .95	36.8 +0.3	54.11 .11	50.6 0.7
34.2	10.72 -1.13	73.1 -0.9	62.89 -1.11	29.7 -0.8	26.94 -94	36.1 +1.1	54.00 -1.11	51.3 -0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Cassiopeia.		$\beta$ Ceti.		$\gamma$ Cassiopeia.		$\delta$ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 0 34	° ' " +55 58	h m 0 38	° ' " -18 32	h m 0 38	° ' " +74 25	h m 0 57	° ' " + 7 20
(Dec. 30.3)	43.72 -.88	63.1 -0.2	29.23 -.12	48.8 -0.5	54.51 -.69	76.1 +0.3	39.98 -.10	35.6 -0.6
Jan. 9.2	43.45 .87	62.7 0.6	29.11 .12	49.3 0.5	53.82 .68	76.1 -0.3	39.87 .11	35.0 0.7
19.2	43.17 .86	61.8 1.1	28.99 .12	49.5 -0.1	53.14 .67	75.5 0.9	39.75 .11	34.3 0.7
29.2	42.92 .85	60.5 1.5	28.88 .11	49.4 +0.2	52.49 .61	74.3 1.4	39.64 .11	33.6 0.7
Feb. 8.1	42.68 .82	58.7 1.9	28.78 .09	49.1 0.5	51.89 .55	72.6 1.9	39.53 .10	32.9 0.6
18.1	42.48 -.17	56.6 -2.2	28.69 -.07	48.5 +0.7	51.38 -.45	70.4 -2.4	39.44 -.08	32.4 -0.5
28.1	42.34 .12	54.3 2.4	28.63 .05	47.7 1.0	50.99 .33	67.8 2.7	39.37 .06	31.9 0.4
Mar. 10.1	42.25 -.06	51.8 2.5	28.59 -.02	46.6 1.2	50.72 .20	65.0 2.9	39.33 -.03	31.5 0.3
20.0	42.22 +0.01	49.2 2.5	28.59 +0.02	45.2 1.5	50.59 -.05	62.1 3.0	39.31 .00	31.4 -0.1
30.0	42.27 .09	46.8 2.4	28.63 .06	43.6 1.7	50.62 +0.10	59.1 2.9	39.33 +0.04	31.4 +0.2
Apr. 9.0	42.40 +0.16	44.5 -2.2	28.71 +0.10	41.8 +1.9	50.80 +0.26	56.2 -2.8	39.40 +0.09	31.7 +0.4
19.0	42.60 .23	42.5 1.9	28.83 .14	39.7 2.1	51.13 .41	53.6 2.5	39.51 .13	32.2 0.7
28.9	42.87 .30	40.8 1.5	28.99 .18	37.6 2.2	51.61 .54	51.3 2.1	39.66 .17	33.0 0.9
May 8.9	43.20 .36	39.6 1.0	29.19 .22	35.3 2.3	52.21 .66	49.3 1.7	39.85 .21	34.1 1.2
18.9	43.59 .41	38.8 0.6	29.43 .26	32.9 2.4	52.93 .76	47.9 1.2	40.08 .24	35.4 1.4
28.9	44.03 +0.45	38.4 -0.2	29.70 +0.26	30.5 +2.4	53.73 +0.83	46.9 -0.7	40.34 +0.27	36.9 +1.6
June 7.8	44.50 .48	38.6 +0.4	30.00 .30	28.1 2.3	54.59 .89	46.5 -0.2	40.62 .29	38.6 1.8
17.8	44.99 .49	39.3 0.9	30.31 .32	25.8 2.2	55.50 .92	46.6 +0.4	40.93 .31	40.4 1.9
27.8	45.48 .49	40.5 1.4	30.64 .32	23.7 2.0	56.42 .92	47.3 0.9	41.25 .32	42.4 2.0
July 7.7	45.97 .48	42.1 1.8	30.96 .32	21.8 1.8	57.34 .90	48.5 1.4	41.57 .32	44.3 2.0
17.7	46.45 +0.46	44.1 +2.2	31.28 +0.31	20.2 +2.5	58.22 +0.86	50.2 +1.9	41.88 +0.31	46.3 +1.9
27.7	46.90 .43	46.5 2.5	31.58 .29	18.8 1.2	59.06 .80	52.3 2.4	42.19 .29	48.2 1.9
Aug. 6.7	47.31 .39	49.2 2.8	31.87 .27	17.8 0.8	59.82 .73	54.9 2.8	42.47 .27	50.0 1.8
16.6	47.67 .34	52.1 3.0	32.12 .24	17.1 0.5	60.51 .64	57.8 3.1	42.73 .24	51.7 1.6
26.6	47.99 .29	55.2 3.1	32.34 .20	16.8 +0.1	61.10 .54	61.0 3.3	42.95 .21	53.2 1.4
Sept. 5.6	48.25 +0.23	58.4 +3.2	32.52 +0.16	16.9 -0.2	61.59 +0.43	64.4 +3.5	43.15 +0.18	54.5 +1.2
15.5	48.45 .18	61.6 3.2	32.67 .12	17.2 0.5	61.97 .32	68.0 3.6	43.31 .14	55.6 0.9
25.5	48.60 .12	64.9 3.2	32.77 .09	17.9 0.8	62.23 .20	71.7 3.7	43.43 .11	56.4 0.7
Oct. 5.5	48.69 .06	68.0 3.1	32.84 .05	18.8 1.0	62.37 +0.08	75.4 3.7	43.53 .08	57.0 0.5
15.5	48.73 +0.01	71.0 2.9	32.87 +0.01	19.9 1.2	62.40 -0.03	79.0 3.5	43.58 .04	57.4 0.3
25.4	48.71 -.04	73.8 +2.7	32.86 -.02	21.2 -1.5	62.31 -.15	82.4 +3.3	43.61 +0.01	57.6 +0.1
Nov. 4.4	48.64 .09	76.4 2.4	32.83 .04	22.5 1.3	62.10 .26	85.7 3.1	43.61 -.01	57.6 -0.1
14.4	48.52 .14	78.6 2.0	32.78 .07	23.9 1.3	61.78 .37	88.6 2.7	43.59 .04	57.4 0.2
24.3	48.36 .18	80.4 1.6	32.70 .09	25.2 1.3	61.37 .46	91.1 2.3	43.54 .06	57.1 0.4
Dec. 4.3	48.16 .21	81.8 1.2	32.60 .20	26.4 1.1	60.86 .55	93.2 1.8	43.47 .08	56.6 0.5
14.3	47.93 -.24	82.8 +0.7	32.49 -.11	27.5 -0.9	60.28 -.61	94.8 +1.3	43.39 -.09	56.1 -0.6
24.3	47.68 .26	83.2 +0.2	32.37 .12	28.3 0.7	59.64 .66	95.8 0.7	43.29 .10	55.5 0.6
34.2	47.41 -.27	83.1 -0.5	32.24 -.15	28.9 -0.5	58.96 -.69	96.1 +0.1	43.19 -.10	54.8 -0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Andromeda.		$\theta^1$ Ceti.		38 Cassiopeia.		$\eta$ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 1 4	° ' +35 4	h m 1 18	° ' - 8 42	h m 1 23	° ' +69 44	h m 1 26	° ' +14 49
(Dec. 30.3)	2.35 -14	64.4 -0.8	56.69 -11	32.2 -0.7	39.52 -47	47.9 +0.8	2.68 -11	22.9 -0.5
Jan. 9.3	2.10 .15	64.0 0.6	56.58 .12	32.8 0.6	39.04 .49	48.4 +0.2	2.57 .12	22.4 0.6
19.2	1.94 .16	63.3 0.9	56.46 .12	33.4 0.5	38.53 .51	48.3 -0.4	2.45 .12	21.7 0.7
29.2	1.79 .15	62.3 1.2	56.33 .12	33.8 0.3	38.02 .50	47.7 1.0	2.32 .12	21.0 0.8
Feb. 8.2	1.64 .14	61.0 1.4	56.22 .11	34.0 -0.1	37.54 .47	46.4 1.5	2.20 .12	20.2 0.8
18.1	1.51 -12	59.5 -2.5	56.11 -10	33.9 +0.1	37.09 -41	44.7 -1.9	2.09 -10	19.4 -0.8
28.1	1.40 .09	57.9 1.6	56.02 .08	33.7 0.4	36.71 .34	42.6 2.5	1.99 .08	18.7 0.7
Mar. 10.1	1.33 .05	56.3 1.6	55.95 .05	33.2 0.6	36.42 .24	40.1 2.6	1.92 .06	18.0 0.6
20.1	1.30 -01	54.6 1.6	55.91 -02	32.4 0.8	36.22 .14	37.5 2.7	1.88 -02	17.4 0.5
30.0	1.32 +04	53.1 1.4	55.91 +02	31.5 1.0	36.14 -02	34.7 2.8	1.87 +02	17.0 0.5
Apr. 9.0	1.38 +09	51.8 -1.2	55.95 +06	30.2 +1.3	36.18 +10	31.9 -2.7	1.91 +06	16.8 -0.1
19.0	1.50 .15	50.7 1.0	56.03 .10	28.8 1.6	36.34 .22	29.2 2.5	1.99 .11	16.8 +0.2
29.0	1.68 .20	49.9 0.7	56.15 .14	27.1 1.8	36.62 .34	26.8 2.5	2.12 .15	17.1 0.4
May 8.9	1.90 .24	49.4 -0.5	56.31 .18	25.3 1.9	37.01 .44	24.7 2.0	2.30 .19	17.7 0.7
18.9	2.17 .28	49.3 +0.1	56.52 .22	23.3 2.0	37.51 .54	22.9 1.5	2.51 .23	18.5 0.9
28.9	2.47 +32	49.6 +0.5	56.76 +25	21.2 +2.1	38.09 +62	21.6 -1.1	2.76 +27	19.6 +1.1
June 7.8	2.81 .35	50.2 0.8	57.03 .28	19.0 2.2	38.74 .68	20.8 0.6	3.04 .29	20.9 1.4
17.8	3.16 .36	51.2 1.2	57.32 .30	16.9 2.1	39.44 .72	20.4 -0.1	3.34 .31	22.4 1.6
27.8	3.54 .37	52.6 1.5	57.63 .31	14.7 2.1	40.18 .74	20.6 +0.3	3.66 .32	24.1 1.8
July 7.8	3.91 .37	54.2 1.8	57.94 .31	12.7 2.0	40.93 .75	21.3 0.9	3.99 .33	25.9 1.9
17.7	4.28 +36	56.1 +2.0	58.26 +31	10.8 +1.8	41.68 +74	22.4 +1.4	4.32 +32	27.8 +1.9
27.7	4.63 .34	58.3 2.2	58.56 .30	9.2 1.5	42.41 .71	24.1 1.9	4.63 .31	29.7 1.9
Aug. 6.7	4.95 .32	60.5 2.3	58.85 .28	7.8 1.3	43.10 .67	26.2 2.5	4.93 .29	31.6 1.8
16.6	5.26 .29	62.9 2.4	59.12 .26	6.6 1.0	43.74 .62	28.6 2.6	5.21 .27	33.4 1.7
26.6	5.53 .25	65.3 2.4	59.36 .23	5.8 0.7	44.33 .55	31.3 2.9	5.47 .24	35.1 1.6
Sept. 5.6	5.76 +21	67.7 +2.4	59.57 +19	5.3 +0.4	44.84 +48	34.4 +3.1	5.69 +21	36.6 +1.5
15.6	5.95 .17	70.1 2.3	59.75 .16	5.1 0.0	45.28 .39	37.6 3.3	5.88 .17	38.0 1.3
25.5	6.11 .13	72.4 2.2	59.89 .13	5.2 -0.3	45.63 .31	41.0 3.4	6.04 .14	39.2 1.1
Oct. 5.5	6.22 .09	74.6 2.1	60.00 .09	5.6 0.5	45.90 .22	44.4 3.4	6.16 .11	40.2 0.9
15.5	6.30 .05	76.6 1.9	60.08 .06	6.2 0.7	46.07 .13	47.8 3.4	6.25 .08	41.0 0.7
25.5	6.34 +02	78.4 +1.7	60.12 +05	7.0 -0.9	46.16 +04	51.2 +3.3	6.31 +05	41.6 +0.5
Nov. 4.4	6.34 -01	80.0 1.5	60.13 .00	8.0 1.0	46.15 -05	54.4 3.1	6.35 +02	42.0 0.5
14.4	6.32 .04	81.3 1.2	60.12 -03	9.1 1.1	46.06 .14	57.4 2.8	6.35 -01	42.2 +0.1
24.4	6.26 .07	82.4 0.9	60.08 .05	10.2 1.1	45.87 .23	60.1 2.5	6.33 .04	42.3 0.0
Dec. 4.3	6.18 .10	83.1 0.6	60.02 .07	11.2 1.1	45.60 .31	62.4 2.1	6.28 .06	42.2 -0.2
14.3	6.07 -12	83.6 +0.5	59.93 -09	12.3 -1.0	45.26 -38	64.3 +1.6	6.21 -08	41.9 -0.5
24.3	5.94 .14	83.7 -0.1	59.84 .10	13.2 0.9	44.85 .44	65.7 1.1	6.12 .10	41.5 0.5
34.3	5.80 -14	83.4 -0.5	59.73 -11	14.1 -0.7	44.39 -48	66.5 +0.6	6.01 -11	41.0 -0.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Eridani. (Achernar.)		$\epsilon$ Piscium.		$\beta$ Arietis.		$\gamma$ Cassiopeia.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 1 33	° ' " -57 44	h m 1 40	° ' " + 8 38	h m 1 49	° ' " +20 18	h m 1 54	° ' " +71 55
(Dec. 30.3)	56.25 -32	88.3 -0.6	1.72 -10	47.7 -0.6	1.61 -11	46.5 -0.3	45.33 -49	65.0 +1.2
Jan. 9.3	55.92 -33	88.7 -0.1	1.61 -11	47.1 0.6	1.50 -12	46.1 0.5	44.83 -54	65.9 0.6
19.2	55.59 -33	88.5 +0.4	1.50 -12	46.5 0.6	1.37 -13	45.5 0.6	44.27 -57	66.3 +0.1
29.2	55.26 -32	87.8 1.0	1.37 -13	45.9 0.6	1.24 -14	44.8 0.7	43.69 -58	66.1 -0.5
Feb. 8.2	54.94 -31	86.6 1.5	1.25 -13	45.2 0.6	1.10 -15	44.0 0.8	43.11 -56	65.2 1.1
18.1	54.64 -28	84.9 +2.0	1.13 -11	44.7 -0.5	0.97 -12	43.2 -0.9	42.56 -52	65.9 -1.6
28.1	54.38 -24	82.7 2.4	1.03 -09	44.2 0.4	0.85 -11	42.3 0.9	42.07 -45	62.1 2.0
Mar. 10.1	54.17 -19	80.1 2.8	0.94 -07	43.8 0.5	0.76 -08	41.4 0.8	41.66 -36	59.8 2.4
20.1	54.00 -14	77.1 3.1	0.89 -04	43.5 -0.1	0.70 -05	40.6 0.8	41.36 -25	57.4 2.6
30.0	53.89 -08	74.0 3.3	0.87 -00	43.5 +0.1	0.67 -01	39.9 0.6	41.17 -12	54.6 2.8
Apr. 9.0	53.85 -01	70.5 +3.5	0.90 +0.4	43.7 +0.5	0.69 +0.4	39.4 -0.4	41.11 +0.1	51.8 -2.8
19.0	53.88 +06	67.0 3.6	0.96 -09	44.0 0.5	0.75 -09	39.0 -0.2	41.19 -15	49.1 2.7
29.0	53.97 -13	63.4 3.6	1.07 -13	44.7 0.7	0.86 -13	38.9 0.0	41.41 -28	46.4 2.5
May 8.9	54.14 -20	59.8 3.5	1.23 -17	45.5 1.0	1.02 -18	39.1 +0.3	41.76 -41	44.0 2.8
18.9	54.37 -26	56.3 3.4	1.42 -21	46.6 1.2	1.22 -22	39.5 0.6	42.23 -52	42.0 1.9
28.9	54.67 +32	53.1 +3.2	1.66 +25	48.0 +1.4	1.46 +26	40.2 +0.8	42.80 +62	40.3 -1.5
June 7.8	55.02 -38	50.0 2.9	1.92 -28	49.5 1.6	1.73 -29	41.2 1.1	43.47 -71	39.0 1.0
17.8	55.42 -42	47.3 2.5	2.22 -30	51.1 1.7	2.03 -31	42.4 1.5	44.22 -79	38.2 -0.5
27.8	55.86 -45	45.0 2.1	2.52 -31	52.9 1.8	2.36 -33	43.8 1.5	45.01 -81	37.9 0.0
July 7.8	56.32 -47	43.1 1.6	2.84 -32	54.8 1.9	2.69 -33	45.4 1.7	45.83 -83	38.1 +0.5
17.7	56.79 +47	41.8 +1.1	3.16 +32	56.6 +1.8	3.02 +33	47.1 +1.8	46.67 +83	38.8 +0.9
27.7	57.26 -46	41.0 +0.5	3.47 -31	58.4 1.8	3.35 -32	48.9 1.8	47.50 -82	40.0 1.4
Aug. 6.7	57.72 -44	40.7 0.0	3.77 -29	60.2 1.7	3.67 -31	50.7 1.8	48.30 -79	41.6 1.8
16.7	58.15 -41	41.1 -0.6	4.06 -27	61.8 1.5	3.97 -29	52.5 1.8	49.07 -74	43.6 2.2
26.6	58.54 -37	42.0 1.2	4.32 -24	63.3 1.4	4.24 -26	54.3 1.7	49.78 -68	46.0 2.6
Sept. 5.6	58.89 +31	43.4 -1.7	4.54 +21	64.5 +1.2	4.49 +23	56.0 +1.6	50.43 +61	48.7 +2.9
15.6	59.17 -25	45.3 2.1	4.74 -18	65.6 1.0	4.71 -20	57.5 1.5	51.00 -53	51.7 3.2
25.5	59.39 -19	47.6 2.5	4.91 -15	66.4 0.7	4.89 -17	58.9 1.3	51.49 -44	54.9 3.2
Oct. 5.5	59.54 -12	50.3 2.7	5.04 -12	67.0 0.5	5.05 -14	60.2 1.2	51.88 -35	58.2 3.3
15.5	59.63 +05	53.1 2.9	5.15 -09	67.4 0.3	5.17 -10	61.3 1.0	52.18 -24	61.6 3.4
25.5	59.64 -02	56.1 -2.9	5.22 +06	67.6 +0.1	5.25 +07	62.1 +0.8	52.38 +14	65.0 +3.4
Nov. 4.4	59.58 -09	59.0 2.9	5.26 +03	67.6 -0.1	5.31 -04	62.8 0.6	52.47 +04	68.3 3.2
14.4	59.46 -15	61.9 2.7	5.28 -00	67.5 0.2	5.34 +01	63.4 0.5	52.46 -07	71.5 3.1
24.4	59.28 -20	64.4 2.4	5.26 -02	67.2 0.3	5.34 -02	63.7 0.3	52.34 -17	74.4 2.8
Dec. 4.4	59.06 -25	66.7 2.0	5.23 -05	66.8 0.4	5.30 -04	63.9 +0.1	52.11 -27	77.0 2.4
14.3	58.79 -29	68.5 -1.6	5.17 -07	66.3 -0.5	5.25 -07	63.9 -0.1	51.79 -36	79.2 +2.0
24.3	58.49 -31	69.8 1.1	5.09 -09	65.8 0.6	5.17 -09	63.7 0.3	51.38 -45	81.0 1.5
34.3	58.16 -32	70.6 -0.5	4.99 -10	65.2 -0.6	5.07 -11	63.4 -0.4	50.90 -52	82.3 +1.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Arietis.		$\xi^1$ Ceti.		$\iota$ Cassiopeiae.		$\xi^2$ Ceti.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 2 1	° ' " +22 58	h m 2 7	° ' " +8 22	h m 2 20	° ' " +66 56	h m 2 22	° ' " +8 0
(Dec. 30.3)	26.81 -10	61.7 -0.2	37.07 -09	14.0 -0.5	41.64 -33	61.0 +1.3	45.68 -08	18.4 -0.5
Jan. 9.3	26.70 -12	61.4 0.3	36.97 -11	13.4 0.6	41.28 -38	62.1 0.8	45.59 -10	17.8 0.6
19.2	26.57 -13	60.9 0.6	36.85 -12	12.8 0.6	40.88 -42	62.7 +0.3	45.48 -12	17.2 0.6
29.2	26.43 -14	60.3 0.7	36.73 -13	12.2 0.6	40.44 -44	62.7 -0.3	45.35 -13	16.6 0.6
Feb. 8.2	26.28 -14	59.5 0.8	36.59 -13	11.7 0.6	39.99 -44	62.1 0.8	45.21 -14	16.0 0.5
18.2	26.14 -13	58.6 -0.9	36.46 -13	11.1 -0.5	39.56 -42	61.1 -1.3	45.07 -13	15.5 -0.5
28.2	26.02 -12	57.7 0.9	36.34 -11	10.7 0.4	39.15 -38	59.6 1.7	44.95 -12	15.1 0.4
Mar. 10.1	25.91 -09	56.8 0.9	36.24 -09	10.3 0.3	38.80 -32	57.6 2.1	44.83 -10	14.8 0.3
20.1	25.84 -06	55.8 0.9	36.16 -06	10.1 -0.1	38.52 -24	55.4 2.4	44.74 -07	14.6 -0.1
30.1	25.79 -02	55.0 0.7	36.12 -02	10.1 0.0	38.33 -14	52.9 2.5	44.69 -04	14.6 +0.1
Apr. 9.1	25.80 +02	54.3 -0.6	36.11 +02	10.2 +0.2	38.24 -04	50.3 -2.6	44.67 -00	14.7 +0.3
19.0	25.85 -07	53.8 0.4	36.15 -06	10.6 0.5	38.25 +07	47.7 2.6	44.69 +05	15.1 0.5
29.0	25.95 -12	53.5 -0.2	36.24 -10	11.1 0.7	38.38 -18	45.2 2.4	44.76 -09	15.7 0.7
May 9.0	26.10 -17	53.5 +0.1	36.37 -15	12.0 0.9	38.61 -29	42.9 2.2	44.88 -14	16.5 0.9
18.9	26.29 -22	53.7 0.4	36.54 -19	13.0 1.1	38.95 -38	40.8 1.9	45.04 -18	17.5 1.1
June 28.9	26.53 +26	54.2 +0.6	36.75 +23	14.2 +1.3	39.38 +47	39.0 -1.6	45.24 +22	18.7 +1.3
7.9	26.80 -29	55.0 0.9	37.00 -26	15.6 1.5	39.89 -54	37.7 1.1	45.47 -25	20.1 1.5
17.9	27.10 -33	56.0 1.1	37.27 -29	17.2 1.6	40.47 -60	36.8 0.7	45.74 -28	21.6 1.6
27.8	27.42 -34	57.3 1.4	37.57 -30	18.9 1.7	41.10 -65	36.3 -0.2	46.03 -30	23.2 1.7
July 7.8	27.76 -34	58.7 1.5	37.88 -31	20.7 1.8	41.76 -67	36.3 +0.2	46.34 -31	24.9 1.7
17.8	28.09 +34	60.3 +1.7	38.20 +32	22.4 +1.8	42.45 +69	36.7 +0.7	46.65 +32	26.7 +1.7
27.7	28.43 -33	62.0 1.7	38.52 -31	24.2 1.7	43.13 -68	37.6 1.1	46.97 -31	28.4 1.7
Aug. 6.7	28.76 -32	63.8 1.8	38.82 -29	25.8 1.6	43.81 -67	39.0 1.5	47.27 -30	30.0 1.6
16.7	29.06 -30	65.6 1.8	39.12 -28	27.4 1.5	44.46 -64	40.7 1.9	47.57 -29	31.5 1.4
26.7	29.35 -27	67.4 1.7	39.39 -26	28.8 1.5	45.08 -60	42.7 2.2	47.85 -27	32.8 1.5
Sept. 5.6	29.61 +25	69.1 +1.6	39.64 +25	29.9 +1.1	45.66 +55	45.1 +2.5	48.11 +24	33.9 +1.0
15.6	29.84 -22	70.7 1.5	39.86 -21	30.9 0.9	46.18 -49	47.8 2.8	48.34 -22	34.9 0.8
25.6	30.05 -19	72.2 1.4	40.05 -18	31.7 0.6	46.64 -42	50.6 2.9	48.54 -19	35.6 0.6
Oct. 5.6	30.22 -15	73.5 1.3	40.21 -15	32.2 0.4	47.02 -35	53.7 3.1	48.72 -16	36.0 0.4
15.5	30.35 -12	74.7 1.1	40.34 -12	32.5 +0.2	47.34 -28	56.8 3.1	48.86 -13	36.3 +0.2
25.5	30.46 +09	75.7 +0.9	40.44 +09	32.7 0.0	47.58 +20	59.9 +3.1	48.98 +10	36.4 0.0
Nov. 4.5	30.53 -06	76.6 0.8	40.51 -06	32.6 -0.1	47.74 -12	63.0 3.1	49.07 -07	36.3 -0.2
14.4	30.57 +03	77.3 0.6	40.55 +03	32.4 0.3	47.82 +03	66.0 2.9	49.12 -04	36.0 0.3
24.4	30.58 -00	77.8 0.4	40.57 -00	32.1 0.4	47.81 -05	68.8 2.7	49.15 +02	35.6 0.4
Dec. 4.4	30.56 -03	78.1 0.3	40.55 -03	31.6 0.5	47.71 -14	71.4 2.4	49.15 -02	35.1 0.5
14.4	30.51 -06	78.2 +0.1	40.51 -05	31.1 -0.5	47.53 -22	73.6 +2.0	49.12 -05	34.6 -0.6
24.3	30.44 -08	78.2 -0.1	40.44 -08	30.5 0.6	47.27 -29	75.5 1.6	49.06 -07	34.0 0.6
34.3	30.34 -11	78.0 -0.3	40.35 -10	29.9 -0.6	46.95 -35	76.8 +1.1	48.98 -09	33.4 -0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Ceti.		$\alpha$ Ceti.		48 Cephei (H.)		$\zeta$ Arietis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 2 38	° ' " + 2 48	h m 2 56	° ' " + 3 41	h m 3 7	° ' " +77 21	h m 3 9	° ' " +20 39
(Dec. 30.3)	2.50 -.08	27.9 -.07	58.53 -.06	29.0 -.07	27.39 -.55	57.9 +2.2	4.13 -.05	70.3 -.01
Jan. 9.3	2.41 .10	27.1 .07	58.45 .09	28.3 .07	26.79 .67	59.8 1.6	4.05 .09	70.1 .02
19.3	2.30 .12	26.4 .06	58.34 .12	27.6 .06	26.08 .76	61.2 1.1	3.95 .12	69.8 .03
29.3	2.17 .13	25.8 .06	58.21 .13	27.0 .06	25.27 .83	62.0 +0.5	3.82 .14	69.5 .04
Feb. 8.2	2.03 .14	25.3 .04	58.08 .14	26.4 .05	24.41 .87	62.3 -.01	3.67 .15	69.0 .05
18.2	1.89 -.14	24.9 -.03	57.93 -.14	26.0 -.04	23.54 -.86	61.9 -.07	3.51 -.16	68.4 -.05
28.2	1.75 .13	24.6 -.02	57.79 .14	25.7 .02	22.69 .82	60.9 1.2	3.35 .15	67.8 .06
Mar. 10.2	1.63 .11	24.5 .00	57.65 .12	25.6 -.01	21.90 .73	59.4 1.7	3.21 .14	67.2 .06
20.1	1.53 .09	24.5 +0.1	57.54 .10	25.3 +0.1	21.22 .61	57.5 2.1	3.08 .11	66.5 .06
30.1	1.46 .05	24.8 .03	57.45 .07	25.7 .03	20.68 .47	55.1 2.5	2.98 .08	65.9 .06
Apr. 9.1	1.42 -.01	25.2 +0.5	57.40 -.03	26.0 +0.5	20.29 -.30	52.5 -2.7	2.92 -.04	65.4 -.05
19.0	1.43 +0.03	25.8 .07	57.39 +0.01	26.6 .07	20.08 -.11	49.8 2.8	2.90 +0.01	65.0 .05
29.0	1.48 .07	26.7 .09	57.42 .06	27.4 .09	20.06 +.08	46.9 2.8	2.93 .05	64.7 -.02
May 9.0	1.58 .12	27.7 1.2	57.50 .10	28.3 1.1	20.24 .27	44.1 2.7	3.01 .10	64.6 .00
19.0	1.72 .16	29.0 1.3	57.63 .15	29.4 1.2	20.60 .45	41.4 2.6	3.14 .15	64.8 +0.2
June 28.9	1.90 +.20	30.4 +1.5	57.79 +.19	30.8 +1.4	21.13 +.62	39.0 -2.3	3.31 +.19	65.1 +0.4
7.9	2.12 .24	32.0 1.6	58.00 .22	32.3 1.5	21.83 .77	36.8 2.0	3.53 .23	65.6 .06
17.9	2.37 .27	33.7 1.7	58.24 .25	33.9 1.6	22.67 .90	35.0 1.6	3.78 .26	66.4 .08
27.8	2.65 .29	35.5 1.8	58.51 .28	35.6 1.7	23.62 1.00	33.6 1.2	4.06 .29	67.3 1.0
July 7.8	2.95 .30	37.2 1.8	58.80 .30	37.3 1.7	24.67 1.09	32.7 .07	4.37 .31	68.4 1.1
17.8	3.25 +.31	39.0 +1.7	59.10 +.30	39.0 +1.7	25.80 +1.14	32.2 -.02	4.69 +.32	69.6 +1.2
27.8	3.56 .31	40.7 1.6	59.41 .31	40.6 1.6	26.96 1.17	32.2 +0.2	5.02 .33	70.9 1.3
Aug. 6.7	3.87 .30	42.2 1.5	59.71 .31	42.1 1.4	28.14 1.18	32.7 .07	5.34 .33	72.2 1.3
16.7	4.17 .29	43.6 1.3	60.02 .30	43.5 1.3	29.32 1.15	33.6 1.1	5.67 .32	73.6 1.3
26.7	4.45 .27	44.8 1.0	60.30 .28	44.6 1.1	30.47 1.13	34.9 1.6	5.98 .30	74.9 1.3
Sept. 5.7	4.71 +.25	45.7 +0.8	60.57 +.26	45.6 +0.8	31.57 +1.07	36.7 +1.9	6.28 +.29	76.1 +1.2
15.6	4.95 .23	46.4 .05	60.83 .24	46.2 .05	32.61 .99	38.8 2.3	6.55 .27	77.3 1.1
25.6	5.16 .20	46.8 .03	61.05 .22	46.7 .03	33.56 .90	41.3 2.6	6.81 .24	78.4 1.0
Oct. 5.6	5.35 .17	47.0 +0.1	61.26 .19	46.8 +0.1	34.41 .79	44.1 2.9	7.04 .22	79.3 .09
15.5	5.51 .14	46.9 -.02	61.43 .16	46.8 -.02	35.15 .67	47.1 3.1	7.24 .19	80.1 .07
25.5	5.63 +.11	46.6 -.04	61.58 +.13	46.5 -.04	35.75 +.53	50.2 +3.2	7.42 +.16	80.8 +0.6
Nov. 4.5	5.73 .08	46.2 .05	61.70 .10	46.0 .05	36.21 .58	53.5 3.3	7.56 .13	81.3 .05
14.5	5.80 .05	45.5 .06	61.78 .07	45.4 .07	36.51 .22	56.8 3.3	7.68 .10	81.7 .04
24.4	5.84 +.02	44.8 .07	61.84 .04	44.7 .08	36.64 +.05	60.1 3.2	7.76 .06	82.0 .02
Dec. 4.4	5.84 -.02	44.1 .08	61.87 +.01	43.9 .08	36.61 -.12	63.2 3.0	7.80 +.03	82.2 +0.1
14.4	5.82 -.04	43.2 -.08	61.86 -.02	43.1 -.08	36.40 -.29	66.0 +2.7	7.81 -.01	82.3 .00
24.4	5.77 .06	42.4 .08	61.82 .05	42.3 .08	36.03 .45	68.6 2.4	7.79 .05	82.2 -.01
34.3	5.69 -.09	41.6 -.07	61.76 -.07	41.5 -.07	35.51 -.60	70.8 +2.0	7.72 -.07	82.1 -.01

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♌ Persei.		♋ Eridani.		♊ Persei.		♉ Tauri.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 3 17	° +49 29	h m 3 28	° - 9 47	h m 3 35	° +47 27	h m 3 41	° +23 47
(Dec. 30.4)	4.81 -10	70.8 +1.8	9.31 -06	69.0 -1.2	42.23 -08	56.9 +1.2	27.28 -03	33.6 +0.1
Jan. 9.3	4.68 -13	71.8 0.8	9.23 -09	70.3 1.1	42.13 -13	57.9 0.9	27.22 -07	33.6 0.0
19.3	4.50 -19	72.4 0.5	9.13 -12	71.3 0.9	41.98 -17	58.6 0.6	27.13 -11	33.6 -0.1
29.3	4.29 -22	72.7 +0.1	9.00 -14	72.1 0.7	41.79 -21	59.0 +0.2	27.01 -14	33.4 0.3
Feb. 8.2	4.05 -24	72.5 -0.5	8.85 -16	72.7 0.5	41.56 -23	59.1 -0.1	26.86 -16	33.0 0.4
18.2	3.80 -25	72.0 -0.6	8.69 -16	73.0 -0.2	41.33 -24	58.7 -0.5	26.69 -17	32.6 -0.5
28.2	3.55 -24	71.2 1.0	8.52 -16	73.1 0.0	41.08 -24	58.1 0.8	26.52 -17	32.1 0.5
Mar. 10.2	3.32 -22	70.0 1.3	8.36 -15	73.0 +0.3	40.85 -22	57.1 1.1	26.36 -16	31.5 0.6
20.1	3.12 -18	68.6 1.5	8.22 -13	72.5 0.6	40.65 -19	55.8 1.3	26.21 -14	30.9 0.6
30.1	2.96 -14	66.9 1.7	8.10 -10	71.8 0.8	40.47 -15	54.4 1.5	26.08 -11	30.2 0.6
Apr. 9.1	2.85 -08	65.2 -1.8	8.01 -07	70.9 +1.1	40.35 -10	52.8 -1.6	25.99 -07	29.6 -0.6
19.1	2.80 -01	63.3 1.8	7.96 -03	69.7 1.3	40.28 -04	51.1 1.7	25.95 -02	29.1 0.5
29.0	2.82 +05	61.6 1.7	7.96 +01	68.3 1.5	40.28 +03	49.4 1.7	25.94 +02	28.6 0.4
May 9.0	2.91 -12	59.8 1.6	7.99 -06	66.6 1.7	40.34 -09	47.8 1.6	25.99 -07	28.3 0.2
19.0	3.07 -19	58.3 1.4	8.08 -11	64.8 1.9	40.47 -16	46.3 1.4	26.09 -12	28.1 -0.1
28.9	3.28 +25	57.0 -1.8	8.20 +15	62.9 +2.0	40.66 +22	45.0 -1.2	26.24 +17	28.2 +0.1
June 7.9	3.57 -31	55.9 0.9	8.37 -19	60.8 2.1	40.91 -28	43.9 0.9	26.43 -21	28.4 0.3
17.9	3.90 -35	55.2 0.6	8.58 -22	58.7 2.1	41.21 -33	43.1 0.6	26.66 -25	28.8 0.5
27.9	4.28 -39	54.7 -0.5	8.82 -25	56.5 2.1	41.56 -36	42.6 0.4	26.92 -28	29.4 0.7
July 7.8	4.69 -42	54.6 +0.1	9.08 -27	54.5 2.0	41.94 -39	42.4 -0.1	27.22 -30	30.1 0.8
17.8	5.12 +44	54.9 +0.4	9.36 +29	52.5 +1.9	42.35 +42	42.5 +0.2	27.53 +32	31.0 +0.9
27.8	5.56 +45	55.4 0.7	9.66 -30	50.7 1.7	42.78 -43	42.9 0.5	27.86 -35	32.0 1.0
Aug. 6.8	6.01 -45	56.3 1.0	9.96 -30	49.2 1.4	43.21 -43	43.5 0.8	28.19 -33	33.1 1.1
16.7	6.46 -44	57.4 1.2	10.26 -29	47.9 1.1	43.64 -43	44.4 1.0	28.52 -35	34.2 1.1
26.7	6.89 -43	58.7 1.5	10.55 -28	47.0 0.8	44.07 -42	45.6 1.2	28.85 -32	35.3 1.1
Sept. 5.7	7.31 +40	60.3 +1.7	10.83 +27	46.4 +0.4	44.48 +40	46.9 +1.4	29.17 +31	36.4 +1.1
15.6	7.70 -38	62.0 1.8	11.09 -25	46.1 +0.1	44.87 -38	48.4 1.6	29.47 -29	37.4 1.0
25.6	8.07 -35	64.0 2.0	11.33 -23	46.2 -0.5	45.24 -36	50.1 1.7	29.75 -27	38.4 0.9
Oct. 5.6	8.40 -31	66.0 2.1	11.56 -21	46.7 0.6	45.58 -33	51.8 1.8	30.01 -25	39.3 0.8
15.6	8.69 -27	68.1 2.1	11.75 -18	47.5 0.9	45.89 -29	53.7 1.9	30.25 -22	40.0 0.7
25.5	8.94 +23	70.2 +2.1	11.92 +15	48.6 -1.2	46.16 +25	55.6 +1.9	30.46 +20	40.7 +0.6
Nov. 4.5	9.15 -18	72.3 2.1	12.06 -12	49.9 1.4	46.39 -21	57.5 1.9	30.64 -17	41.3 0.5
14.5	9.31 -12	74.4 2.0	12.16 -09	51.4 1.5	46.58 -16	59.4 1.9	30.80 -14	41.8 0.4
24.5	9.43 -08	76.4 1.9	12.24 -06	53.0 1.6	46.71 -11	61.2 1.8	30.91 -10	42.2 0.4
Dec. 4.4	9.48 +05	78.2 1.8	12.28 +02	54.6 1.6	46.80 -06	63.0 1.7	30.99 -06	42.6 0.3
14.4	9.49 -02	79.9 +1.6	12.29 -02	56.1 -1.5	46.83 +01	64.6 +1.5	31.04 +02	42.8 +0.2
24.4	9.44 -08	81.4 1.3	12.26 -04	57.6 1.4	46.81 -05	66.0 1.3	31.04 -02	43.0 0.1
34.4	9.34 -12	82.5 +1.0	12.20 -07	59.0 -1.2	46.74 -10	67.2 +1.1	31.00 -05	43.0 +0.1



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Persel.		γ Eridani.		γ Tauri.		ε Tauri.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 3 47	° ' " +31 34	h m 3 53	° ' " -13 47	h m 4 13	° ' " +15 22	h m 4 22	° ' " +18 57
(Dec. 30.4)	45.40 -03	62.3 +0.5	18.22 -04	53.5 -1.6	61.45 -01	60.6 -0.2	41.81 .00	23.1 -0.1
Jan. 9.3	45.34 .08	62.7 0.3	18.15 .08	55.0 1.4	61.42 .05	60.2 0.3	41.79 -04	22.9 0.2
19.3	45.25 .12	62.9 +0.1	18.05 .11	56.2 1.1	61.35 .09	59.9 0.3	41.73 .08	22.7 0.2
29.3	45.11 .15	62.9 -0.1	17.93 .14	57.3 0.9	61.25 .12	59.5 0.3	41.63 .11	22.5 0.2
Feb. 8.3	44.95 .17	62.8 0.3	17.77 .16	58.0 0.6	61.12 .14	59.2 0.4	41.50 .14	22.2 0.3
18.2	44.77 -0.18	62.4 -0.4	17.61 -0.17	58.4 -0.3	60.96 -0.16	58.8 -0.4	41.34 -0.16	21.9 -0.3
28.2	44.59 .18	61.9 0.6	17.43 .17	58.6 0.0	60.80 .16	58.5 0.4	41.17 .17	21.6 0.4
Mar. 10.2	44.41 .17	61.2 0.7	17.26 .16	58.4 +0.3	60.63 .16	58.1 0.3	41.00 .17	21.2 0.4
20.2	44.24 .15	60.4 0.8	17.10 .15	58.0 0.6	60.48 .15	57.8 0.3	40.84 .15	20.8 0.4
30.1	44.10 .12	59.5 0.9	16.96 .12	57.2 0.9	60.35 .12	57.5 0.2	40.70 .13	20.5 0.4
Apr. 9.1	44.00 -0.08	58.6 -0.9	16.86 -0.09	56.2 +1.2	60.23 -0.09	57.3 -0.2	40.58 -0.10	20.1 -0.3
19.1	43.94 -0.03	57.6 0.9	16.78 .05	54.9 1.4	60.15 .05	57.2 -0.1	40.50 .06	19.8 0.2
29.1	43.93 +0.02	56.8 0.8	16.75 -0.01	53.4 1.7	60.12 -0.01	57.2 +0.1	40.46 -0.02	19.7 -0.1
May 9.0	43.97 .07	56.0 0.7	16.76 +0.04	51.6 1.9	60.14 +0.04	57.3 0.2	40.46 +0.03	19.6 0.0
19.0	44.07 .12	55.4 0.5	16.82 .08	49.7 2.0	60.20 .08	57.5 0.3	40.52 .08	19.6 +0.1
29.0	44.22 +0.17	54.9 -0.4	16.92 +0.12	47.6 +2.2	60.30 +0.13	58.0 +0.5	40.62 +0.12	19.8 +0.3
June 7.9	44.42 .22	54.7 -0.2	17.07 .16	45.4 2.2	60.45 .17	58.5 0.6	40.76 .17	20.1 0.4
17.9	44.66 .26	54.6 0.0	17.25 .20	43.2 2.3	60.65 .21	59.2 0.8	40.95 .21	20.6 0.5
27.9	44.94 .29	54.8 +0.2	17.47 .23	40.9 2.2	60.87 .24	60.1 0.9	41.18 .24	21.2 0.7
July 7.9	45.25 .32	55.1 0.4	17.72 .26	38.7 2.1	61.13 .27	61.0 1.0	41.44 .27	21.9 0.8
17.8	45.58 +0.34	55.7 +0.6	17.99 +0.28	36.7 +2.0	61.41 +0.28	62.0 +1.0	41.72 +0.29	22.7 +0.8
27.8	45.92 .35	56.4 0.8	18.28 .29	34.8 1.8	61.71 .30	63.1 1.0	42.02 .31	23.6 0.9
Ang. 6.8	46.28 .35	57.3 0.9	18.58 .30	33.2 1.4	62.02 .31	64.1 1.0	42.33 .31	24.5 0.9
16.8	46.63 .35	58.3 1.0	18.88 .30	31.9 1.1	62.33 .31	65.1 1.0	42.65 .32	25.4 0.9
26.7	46.98 .34	59.3 1.1	19.17 .29	31.0 0.7	62.64 .31	66.1 0.9	42.96 .32	26.3 0.8
Sept. 5.7	47.32 +0.33	60.4 +1.1	19.46 +0.28	30.4 +0.4	62.95 +0.30	66.9 +0.8	43.28 +0.31	27.0 +0.7
15.7	47.65 .32	61.6 1.1	19.74 .27	30.3 0.0	63.25 .29	67.6 0.6	43.59 .30	27.7 0.6
25.6	47.95 .30	62.7 1.1	20.00 .25	30.5 -0.4	63.53 .28	68.1 0.5	43.88 .29	28.3 0.5
Oct. 5.6	48.24 .27	63.8 1.1	20.24 .23	31.1 0.8	63.80 .26	68.5 0.3	44.16 .27	28.7 0.4
15.6	48.50 .24	64.9 1.1	20.46 .20	32.1 1.2	64.05 .24	68.7 +0.2	44.42 .25	29.0 0.3
25.6	48.73 +0.22	66.0 +1.0	20.65 +1.18	33.4 -1.5	64.28 +0.22	68.8 0.0	44.66 +0.23	29.3 +0.2
Nov. 4.5	48.94 .19	67.0 1.0	20.81 .15	35.0 1.7	64.48 .19	68.7 -0.1	44.88 .20	29.4 +0.1
14.5	49.11 .15	67.9 0.9	20.94 .11	36.7 1.8	64.66 .16	68.6 0.2	45.07 .17	29.4 0.0
24.5	49.24 .11	68.8 0.8	21.04 .08	38.6 1.9	64.80 .13	68.4 0.3	45.22 .14	29.4 -0.1
Dec. 4.5	49.33 .07	69.6 0.7	21.11 .05	40.5 1.9	64.91 .09	68.1 0.3	45.34 .10	29.3 0.1
14.4	49.38 +0.03	70.3 +0.6	21.13 +0.01	42.4 -1.8	64.98 +0.03	67.8 -0.3	45.43 +0.06	29.2 -0.1
24.4	49.39 -0.01	70.9 0.5	21.12 -0.03	44.1 1.7	65.01 +0.01	67.4 0.3	45.47 +0.02	29.1 0.1
34.4	49.36 -0.05	71.3 +0.4	21.08 -0.06	45.8 -1.5	65.01 -0.03	67.1 -0.2	45.47 -0.02	28.9 -0.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Tauri. (Aldebaran.)		$\alpha$ Camelopardalia.		$\epsilon$ Aurigæ.		$\pi$ Orionis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 4 30	° ' +16 18	h m 4 43	° ' +66 10	h m 4 50	° ' +33 0	h m 4 58	° ' +15 15
(Dec. 30.4)	6.25 .00	22.5 -0.3	58.85 -0.04	23.0 +2.3	23.63 +0.03	25.5 +0.7	46.70 +0.03	49.1 -0.3
Jan. 9.4	6.24 -0.04	22.2 0.3	58.75 .13	25.2 2.0	23.63 -0.03	26.1 0.3	46.71 -0.02	48.7 0.4
19.4	6.18 .08	21.9 0.3	58.55 .24	27.1 1.8	23.58 .08	26.6 0.4	46.67 .06	48.4 0.3
29.3	6.08 .11	21.6 0.3	58.27 .32	28.7 1.4	23.48 .18	27.0 0.3	46.59 .10	48.1 0.3
Feb. 8.3	5.96 .14	21.3 0.3	57.91 .39	29.9 0.9	23.34 .13	27.2 +0.1	46.47 .13	47.8 0.3
18.3	5.80 -0.16	21.0 -0.3	57.50 -0.43	30.5 +0.4	23.17 -0.18	27.3 0.0	46.33 -0.15	47.5 -0.3
28.2	5.64 .17	20.7 0.3	57.05 .45	30.7 0.0	22.98 .19	27.2 -0.2	46.17 .17	47.2 0.3
Mar. 10.2	5.47 .17	20.4 0.3	56.60 .45	30.4 -0.5	22.79 .20	26.9 0.4	46.00 .17	47.0 0.2
20.2	5.31 .16	20.0 0.3	56.15 .42	29.6 1.0	22.59 .19	26.4 0.3	45.83 .16	46.8 0.2
30.2	5.16 .13	19.8 0.3	55.75 .38	28.4 1.4	22.41 .16	25.8 0.7	45.67 .13	46.6 0.2
Apr. 9.1	5.04 -0.10	19.5 -0.2	55.40 -0.31	26.8 -1.7	22.26 -0.13	25.1 -0.8	45.53 -0.18	46.4 -0.1
19.1	4.95 .07	19.4 -0.1	55.13 .23	24.9 2.0	22.15 .09	24.3 0.8	45.43 .09	46.3 -0.1
29.1	4.91 -0.02	19.3 0.0	54.94 .14	22.7 2.2	22.07 -0.05	23.5 0.8	45.36 .05	46.3 0.0
May 9.1	4.90 +0.02	19.4 +0.1	54.86 -0.03	20.4 2.3	22.05 .00	22.7 0.8	45.33 -0.01	46.4 +0.1
19.0	4.95 .07	19.5 0.2	54.87 +0.07	18.0 2.4	22.09 +0.06	21.9 0.7	45.35 +0.04	46.6 0.2
29.0	5.04 +0.11	19.8 +0.4	54.99 +0.17	15.7 -2.3	22.18 +0.11	21.2 -0.6	45.41 +0.09	46.9 +0.4
June 8.0	5.18 .16	20.3 0.3	55.22 .27	13.4 2.2	22.30 .16	20.6 0.5	45.32 .13	47.4 0.3
17.9	5.36 .20	20.9 0.6	55.53 .36	11.2 2.0	22.49 .20	20.1 0.4	45.67 .17	47.9 0.6
27.9	5.58 .23	21.6 0.8	55.94 .44	9.3 1.8	22.71 .24	19.8 0.2	45.86 .21	48.6 0.7
July 7.9	5.82 .26	22.4 0.8	56.42 .51	7.6 1.5	22.97 .28	19.7 -0.1	46.08 .24	49.3 0.8
17.9	6.09 +0.29	23.3 +0.9	56.97 +0.57	6.2 -1.2	23.27 +0.31	19.7 +0.1	46.34 +0.26	50.1 +0.8
27.8	6.38 .30	24.2 0.9	57.57 .62	5.2 0.9	23.59 .33	19.8 0.2	46.61 .28	50.9 0.8
Aug. 6.8	6.69 .31	25.1 0.9	58.21 .63	4.5 0.5	23.92 .34	20.0 0.3	46.90 .29	51.7 0.8
16.8	7.00 .31	26.0 0.9	58.87 .68	4.1 -0.2	24.27 .35	20.4 0.4	47.20 .30	52.4 0.7
26.8	7.31 .31	26.8 0.8	59.56 .69	4.1 +0.2	24.62 .35	20.9 0.5	47.51 .31	53.1 0.6
Sept. 5.7	7.62 +0.31	27.6 +0.7	60.25 +0.69	4.5 +0.5	24.98 +0.35	21.4 +0.5	47.82 +0.31	53.6 +0.5
15.7	7.93 .30	28.2 0.5	60.93 .68	5.2 0.9	25.33 .35	21.9 0.6	48.12 .30	54.1 0.4
25.7	8.22 .29	28.6 0.4	61.60 .65	6.2 1.2	25.67 .34	22.6 0.6	48.42 .30	54.4 0.2
Oct. 5.6	8.50 .27	28.9 0.2	62.24 .62	7.6 1.5	26.00 .32	23.2 0.6	48.71 .28	54.6 +0.1
15.6	8.76 .25	29.1 +0.1	62.84 .58	9.2 1.8	26.32 .30	23.8 0.6	48.99 .27	54.6 -0.1
25.6	9.00 +0.23	29.2 0.0	63.40 +0.53	11.1 +2.0	26.61 +0.28	24.5 +0.7	49.25 +0.23	54.4 -0.2
Nov. 4.6	9.22 .20	29.1 -0.1	63.89 .46	13.2 2.2	26.88 .26	25.1 0.7	49.49 .23	54.2 0.3
14.5	9.42 .17	29.0 0.2	64.32 .39	15.6 2.4	27.12 .23	25.8 0.7	49.71 .20	53.8 0.4
24.5	9.58 .14	28.7 0.2	64.67 .31	18.0 2.5	27.33 .19	26.5 0.7	49.90 .17	53.4 0.4
Dec. 4.5	9.70 .11	28.5 0.3	64.94 .21	20.6 2.5	27.50 .14	27.2 0.7	50.05 .13	53.0 0.4
14.5	9.79 +0.07	28.2 -0.3	65.10 +0.12	23.1 +2.5	27.62 +0.10	27.9 +0.7	50.17 +0.09	52.5 -0.4
24.4	9.84 +0.03	27.8 0.3	65.17 +0.01	25.6 2.4	27.70 .05	28.6 0.6	50.24 .05	52.1 0.4
34.4	9.84 -0.01	27.5 -0.3	65.13 -0.08	27.9 +2.2	27.72 +0.01	29.2 +0.6	50.27 +0.01	51.7 -0.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Aurigæ. ( <i>Capella</i> .)		$\beta$ Orionis. ( <i>Rigel</i> .)		$\beta$ Tauri.		Groombridge 966.	
	Right. Ascension.	Declination <i>North</i> .	Right Ascension.	Declination <i>South</i> .	Right Ascension.	Declination <i>North</i> .	Right Ascension.	Declination <i>North</i> .
	h m 5 9	° ' " +45 53	h m 5 9	° ' " - 8 18	h m 5 19	° ' " +28 31	h m 5 26	° ' " +74 58
(Dec. 30.4)	12.31 +.03	48.3 +1.4	40.31 +.03	67.8 -1.6	53.22 +.06	23.0 +.4	12.91 +.04	44.1 +2.8
Jan. 9.4	12.32 -.08	49.6 1.8	40.30 -.08	69.5 1.5	53.25 .00	23.4 0.4	12.85 -.14	46.8 2.6
19.4	12.27 -.08	50.7 1.1	40.26 .06	70.9 1.3	53.22 -.03	23.7 0.3	12.62 .30	49.3 2.3
29.4	12.16 -.14	51.7 0.9	40.18 .10	72.1 1.1	53.15 .09	24.0 0.8	12.24 .45	51.5 2.0
Feb. 8.3	12.00 .19	52.5 0.6	40.06 .13	73.1 0.9	53.04 .13	24.2 0.2	11.73 .57	53.3 1.6
18.3	11.79 -.28	53.0 +0.3	39.91 -.16	73.9 -0.6	52.89 -.16	24.3 +0.1	11.11 -.66	54.7 +1.1
28.3	11.56 .24	53.2 0.0	39.74 .17	74.4 0.4	52.72 .18	24.3 0.0	10.42 .72	55.5 +0.6
Mar. 10.2	11.32 .24	53.0 -0.3	39.57 .18	74.6 -0.1	52.53 .19	24.1 -0.2	9.68 .74	55.8 0.0
20.2	11.07 .24	52.6 0.6	39.39 .17	74.6 +0.1	52.34 .19	23.9 0.3	8.94 .73	55.5 -0.3
30.2	10.84 .28	51.9 0.8	39.22 .16	74.4 0.4	52.16 .17	23.5 0.4	8.23 .68	54.7 1.0
Apr. 9.2	10.64 -.18	51.0 -1.0	39.07 -.14	73.9 +0.6	52.00 -.14	23.1 -0.3	7.58 -.61	53.4 -1.3
19.1	10.48 .14	49.8 1.2	38.95 .11	73.1 0.9	51.87 .11	22.6 0.3	7.02 .50	51.7 1.9
29.1	10.37 .08	48.5 1.3	38.86 .07	72.1 1.1	51.78 .07	22.0 0.6	6.57 .38	49.6 2.2
May 9.1	10.31 -.03	47.1 1.4	38.81 -.03	70.9 1.3	51.73 -.08	21.4 0.6	6.26 .24	47.2 2.3
19.1	10.32 +.04	45.6 1.4	38.80 +.01	69.5 1.5	51.73 +.03	20.9 0.3	6.10 -.09	44.6 2.6
29.0	10.38 +.10	44.2 -1.4	38.84 +.06	67.9 +1.6	51.78 +.07	20.4 -0.4	6.09 +.07	41.9 -2.7
June 8.0	10.51 .16	42.8 1.3	38.92 .10	66.2 1.7	51.88 .12	20.0 0.4	6.24 .22	39.2 2.7
18.0	10.70 .21	41.5 1.2	39.04 .14	64.4 1.8	52.03 .17	19.7 0.3	6.54 .37	36.5 2.6
27.9	10.93 .26	40.4 1.1	39.20 .18	62.5 1.9	52.22 .21	19.5 0.2	6.98 .51	34.0 2.3
July 7.9	11.22 .31	39.4 0.9	39.39 .21	60.7 1.8	52.44 .24	19.4 -0.1	7.56 .63	31.6 2.3
17.9	11.54 +.34	38.7 -0.7	39.61 +.23	58.9 +1.7	52.70 +.27	19.4 0.0	8.25 +.74	29.4 -2.0
27.9	11.90 .57	38.1 0.5	39.86 .25	57.2 1.6	52.99 .29	19.5 +0.1	9.04 .84	27.6 1.7
Aug. 6.8	12.29 .39	37.7 0.3	40.12 .27	55.7 1.4	53.29 .31	19.7 0.2	9.92 .91	26.1 1.3
16.8	12.69 .41	37.5 -0.1	40.40 .26	54.4 1.1	53.61 .33	19.9 0.2	10.87 .97	24.9 1.0
26.8	13.10 .42	37.5 +0.1	40.69 .29	53.4 0.8	53.94 .33	20.1 0.3	11.87 1.02	24.1 0.6
Sept. 5.8	13.52 +.42	37.7 +0.3	40.98 +.29	52.7 +0.5	54.28 +.34	20.4 +0.3	12.90 +1.04	23.8 -0.2
15.7	13.94 .42	38.0 0.4	41.27 .29	52.4 +0.1	54.62 .34	20.7 0.3	13.95 1.05	23.8 +0.2
25.7	14.35 .41	38.5 0.6	41.55 .28	52.4 -0.2	54.96 .33	20.9 0.3	15.00 1.04	24.2 0.6
Oct. 5.7	14.76 .40	39.2 0.7	41.83 .27	52.9 0.6	55.29 .32	21.2 0.3	16.03 1.01	25.0 1.0
15.6	15.15 .38	40.0 0.9	42.09 .26	53.6 0.9	55.60 .31	21.5 0.2	17.02 .96	26.2 1.4
25.6	15.52 +.35	41.0 +1.0	42.35 +.24	54.7 -1.2	55.91 +.29	21.7 +0.2	17.95 +.90	27.7 +1.7
Nov. 4.6	15.85 .32	42.1 1.1	42.57 .22	56.1 1.3	56.19 .27	21.9 0.2	18.81 .81	29.6 2.0
14.6	16.16 .29	43.3 1.2	42.78 .19	57.7 1.7	56.45 .24	22.2 0.2	19.57 .70	31.8 2.3
24.5	16.42 .24	44.6 1.3	42.96 .16	59.5 1.8	56.68 .21	22.4 0.3	20.21 .58	34.3 2.6
Dec. 4.5	16.64 .19	45.9 1.4	43.10 .12	61.3 1.9	56.87 .17	22.7 0.3	20.73 .44	37.0 2.7
14.5	16.81 +.14	47.3 +1.4	43.21 +.08	63.2 -1.9	57.02 +.13	23.0 +0.3	21.09 +.28	39.7 +2.8
24.5	16.91 .08	48.7 1.4	43.27 .04	65.0 1.8	57.13 .08	23.3 0.3	21.29 +.12	42.6 2.8
34.4	16.96 +.02	50.1 +1.3	43.29 +.01	66.8 -1.6	57.19 +.04	23.7 +0.4	21.33 -.03	45.4 +2.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Orionis.		$\epsilon$ Leporis.		$\epsilon$ Orionis.		$\epsilon$ Columbae.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 5 26	° ' " — 0 22	h m 5 28	° ' " —17 53	h m 5 31	° ' " — 1 15	h m 5 35	° ' " —34 7
(Dec. 30.4)	49.96 +.03	25.8 —1.2	16.07 +.03	41.8 —2.1	4.48 +.05	58.6 —1.3	59.67 +.01	42.8 —2.8
Jan. 9.4	49.98 .00	27.1 1.2	16.07 —.02	44.0 2.0	4.50 .00	59.9 1.3	59.65 —.05	45.6 2.6
19.4	49.96 —.04	28.2 1.1	16.03 .06	45.9 1.8	4.48 —.04	61.1 1.1	59.58 .10	48.1 2.3
29.4	49.90 .08	29.2 0.9	15.95 .10	47.5 1.5	4.42 .08	62.1 0.9	59.46 .14	50.3 2.0
Feb. 8.3	49.79 .12	30.0 0.7	15.82 .14	48.9 1.2	4.32 .12	63.0 0.8	59.30 .18	52.1 1.6
18.3	49.66 —.15	30.7 —0.5	15.67 —.17	49.9 —0.9	4.19 —.14	63.7 —0.6	59.10 —.21	53.5 —1.2
28.3	49.50 .16	31.1 0.4	15.49 .18	50.6 0.5	4.03 .16	64.2 0.4	58.88 .23	54.4 0.7
Mar. 10.3	49.33 .17	31.4 —0.2	15.30 .19	51.0 —0.2	3.86 .17	64.4 —0.2	58.65 .24	54.9 —0.3
20.2	49.16 .17	31.5 0.0	15.11 .19	51.0 +0.1	3.69 .17	64.6 0.0	58.40 .24	54.9 +0.2
30.2	48.99 .16	31.4 +0.2	14.92 .18	50.7 0.5	3.52 .16	64.5 +0.2	58.17 .23	54.5 0.6
Apr. 9.2	48.84 —.14	31.2 +0.4	14.75 —.16	50.1 +0.8	3.37 —.14	64.2 +0.4	57.95 —.21	53.7 +1.0
19.2	48.72 .11	30.7 0.5	14.60 .13	49.2 1.1	3.24 .11	63.7 0.6	57.78 .18	52.4 1.4
29.1	48.63 .07	30.1 0.7	14.49 .10	47.9 1.4	3.14 .08	63.1 0.8	57.60 .14	50.8 1.8
May 9.1	48.57 —.03	29.3 0.9	14.42 .06	46.4 1.6	3.09 —.04	62.3 0.9	57.48 .10	48.8 2.1
19.1	48.56 +.01	28.3 1.0	14.38 —.01	44.6 1.8	3.07 .00	61.3 1.1	57.41 —.05	46.6 2.4
29.0	48.59 +.05	27.2 +1.2	14.39 +.03	42.7 +2.0	3.09 +.04	60.1 +1.2	57.38 .00	44.1 +2.6
June 8.0	48.66 .09	26.0 1.3	14.44 .07	40.6 2.1	3.16 .09	58.8 1.3	57.40 +.04	41.4 2.7
18.0	48.77 .13	24.6 1.4	14.54 .11	38.4 2.2	3.26 .13	57.5 1.4	57.47 .09	38.6 2.8
28.0	48.92 .17	23.2 1.4	14.67 .15	36.2 2.2	3.41 .16	56.0 1.4	57.58 .14	35.7 2.8
July 7.9	49.10 .20	21.8 1.4	14.84 .19	33.9 2.2	3.59 .19	54.6 1.5	57.74 .18	32.9 2.7
17.9	49.31 +.23	20.4 +1.4	15.04 +.22	31.7 +2.1	3.80 +.22	53.1 +1.4	57.94 +.21	30.2 +2.6
27.9	49.55 .25	19.1 1.3	15.27 .24	29.7 1.9	4.03 .24	51.7 1.3	58.17 .24	27.7 2.3
Aug. 6.8	49.81 .27	17.8 1.2	15.53 .26	27.9 1.6	4.28 .26	50.5 1.2	58.43 .27	25.5 2.0
16.8	50.08 .28	16.8 1.0	15.80 .28	26.4 1.3	4.55 .28	49.4 1.0	58.71 .29	23.7 1.6
26.8	50.36 .29	15.9 0.7	16.08 .29	25.3 1.0	4.84 .29	48.6 0.7	59.02 .31	22.2 1.2
Sept. 5.8	50.65 +.29	15.3 +0.5	16.37 +.29	24.5 +0.6	5.12 +.29	48.0 +0.5	59.33 +.32	21.3 +0.7
15.7	50.94 .29	15.0 +0.2	16.67 .29	24.1 +0.1	5.41 .29	47.6 +0.2	59.65 .32	20.9 +0.1
25.7	51.23 .29	15.0 —0.1	16.96 .29	24.3 —0.3	5.70 .29	47.6 —0.1	59.97 .32	21.1 —0.4
Oct. 5.7	51.52 .28	15.3 0.4	17.25 .28	24.8 0.8	5.99 .28	48.0 0.4	60.29 .31	21.8 1.0
15.7	51.79 .27	15.8 0.7	17.53 .27	25.8 1.2	6.27 .27	48.6 0.7	60.59 .30	23.0 1.5
25.6	52.05 +.25	16.7 —0.9	17.79 +.25	27.2 —1.6	6.53 +.26	49.5 —1.0	60.88 +.28	24.8 —2.0
Nov. 4.6	52.30 .23	17.8 1.1	18.03 .23	29.0 1.9	6.78 .24	50.6 1.2	61.14 .25	27.0 2.4
14.6	52.53 .21	19.0 1.3	18.25 .20	31.0 2.1	7.01 .21	51.9 1.4	61.38 .28	29.6 2.7
24.5	52.72 .18	20.4 1.4	18.44 .17	33.3 2.3	7.21 .18	53.3 1.5	61.57 .18	32.5 2.9
Dec. 4.5	52.89 .15	21.9 1.5	18.60 .14	35.6 2.4	7.38 .15	54.9 1.5	61.73 .15	35.5 3.1
14.5	53.02 +.11	23.4 —1.5	18.71 +.10	38.0 —2.4	7.51 +.11	56.4 —1.5	61.84 +.09	38.6 —3.1
24.5	53.11 .07	24.8 1.4	18.78 .05	40.4 2.3	7.60 .07	57.9 1.5	61.90 +.04	41.7 3.0
34.5	53.15 +.03	26.2 —1.2	18.81 +.01	42.6 —2.1	7.65 +.03	59.3 —1.3	61.91 —.01	44.6 —2.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Orionis.		$\nu$ Orionis.		$\epsilon$ Camelop. (H.)		$\mu$ Geminorum.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 5 49	° ' " + 7 23	h m 6 1	° ' " + 14 46	h m 6 7	° ' " + 69 21	h m 6 16	° ' " + 22 33
(Dec. 30.5)	41.30 +.07	19.8 -0.8	47.41 +.10	53.0 -0.5	42.03 +.15	25.1 +2.6	50.02 +.18	59.5 0.0
Jan. 9.5	41.35 +.02	18.9 0.9	47.47 +.04	52.5 0.5	42.12 +.02	27.7 2.5	50.10 .06	59.4 0.0
19.4	41.35 -.02	18.1 0.8	47.49 -.01	52.1 0.4	42.08 -.10	30.1 2.4	50.14 +.01	59.5 0.0
29.4	41.31 .06	17.4 0.6	47.46 .05	51.8 0.3	41.91 .22	32.4 2.1	50.12 -.04	59.5 +0.1
Feb. 8.4	41.23 .10	16.9 0.5	47.38 .09	51.5 0.2	41.64 .33	34.4 1.8	50.05 .09	59.6 0.1
18.3	41.11 -.13	16.4 -0.4	47.27 -.12	51.3 -0.1	41.26 -.41	36.0 +1.4	49.94 -.13	59.7 +0.1
28.3	40.96 .15	16.1 0.3	47.13 .15	51.2 0.1	40.81 .48	37.2 1.0	49.80 .15	59.8 +0.1
Mar. 10.3	40.80 .17	15.8 0.2	46.96 .17	51.1 0.1	40.31 .52	38.0 +0.5	49.63 .17	59.9 0.0
20.3	40.62 .17	15.7 -0.1	46.79 .17	51.0 -0.1	39.78 .53	38.2 0.0	49.45 .18	59.9 0.0
30.2	40.45 .16	15.7 0.0	46.62 .17	50.9 0.0	39.24 .52	38.0 -0.5	49.27 .18	59.9 -0.1
Apr. 9.2	40.30 -.14	15.8 +0.1	46.45 -.15	50.9 0.0	38.74 -.48	37.2 -1.0	49.10 -.16	59.8 -0.1
19.2	40.16 .12	16.0 0.2	46.31 .12	50.9 0.0	38.29 .42	36.1 1.4	48.95 .15	59.7 0.2
29.2	40.06 .09	16.3 0.4	46.20 .09	50.9 +0.1	37.90 .34	34.5 1.8	48.83 .11	59.5 0.2
May 9.1	39.99 .05	16.7 0.5	46.13 .05	51.0 0.1	37.61 .25	32.5 2.1	48.74 .07	59.3 0.2
19.1	39.97 -.01	17.2 0.6	46.09 -.01	51.2 0.2	37.41 .14	30.3 2.3	48.69 -.05	59.1 0.2
29.1	39.98 +.04	17.9 +0.7	46.10 +.05	51.4 +0.3	37.33 -.05	27.9 -2.4	48.69 +.02	58.9 -0.2
June 8.0	40.04 .08	18.6 0.8	46.15 .07	51.7 0.3	37.35 +.08	25.4 2.5	48.73 .06	58.7 0.1
18.0	40.14 .12	19.4 0.9	46.24 .11	52.1 0.4	37.49 .19	22.9 2.5	48.81 .10	58.6 -0.1
28.0	40.27 .15	20.3 0.9	46.38 .15	52.5 0.5	37.73 .30	20.3 2.5	48.93 .14	58.5 0.0
July 8.0	40.44 .19	21.3 1.0	46.54 .18	53.0 0.5	38.08 .39	17.9 2.4	49.10 .18	58.5 0.0
17.9	40.64 +.22	22.3 +0.9	46.74 +.21	53.5 +0.5	38.52 +.48	15.6 -2.2	49.29 +.21	58.5 0.0
27.9	40.87 .24	23.2 0.9	46.97 .24	54.1 0.5	39.04 .56	13.5 2.0	49.52 .24	58.6 0.0
Aug. 6.9	41.12 .26	24.0 0.8	47.22 .26	54.5 0.4	39.63 .63	11.6 1.7	49.77 .26	58.6 0.0
16.9	41.39 .27	24.8 0.7	47.49 .28	54.9 0.4	40.29 .68	10.1 1.4	50.04 .28	58.6 0.0
26.8	41.67 .28	25.4 0.5	47.77 .29	55.3 0.3	40.99 .72	8.8 1.1	50.34 .30	58.6 0.0
Sept. 5.8	41.96 +.29	25.8 +0.3	48.07 +.30	55.5 +0.2	41.74 +.76	7.8 -0.8	50.64 +.31	58.5 -0.1
15.8	42.25 .30	26.0 +0.1	48.37 .30	55.6 0.0	42.51 .78	7.2 0.4	50.95 .32	58.4 0.2
25.7	42.55 .30	26.0 -0.1	48.68 .31	55.5 -0.1	43.29 .79	6.9 -0.1	51.27 .32	58.2 0.2
Oct. 5.7	42.84 .29	25.8 0.3	48.98 .31	55.3 0.3	44.08 .78	7.0 +0.3	51.60 .32	57.9 0.3
15.7	43.13 .28	25.3 0.6	49.29 .30	54.9 0.4	44.86 .77	7.5 0.6	51.92 .32	57.6 0.4
25.7	43.41 +.27	24.6 -0.7	49.59 +.29	54.4 -0.6	45.61 +.73	8.3 +1.0	52.24 +.31	57.2 -0.4
Nov. 4.6	43.68 .26	23.8 0.9	49.87 .27	53.8 0.6	46.33 .69	9.5 1.4	52.55 .30	56.8 0.4
14.6	43.93 .24	22.8 1.0	50.13 .25	53.1 0.7	46.99 .62	11.1 1.7	52.84 .28	56.3 0.5
24.6	44.15 .21	21.8 1.1	50.38 .23	52.4 0.7	47.58 .54	12.9 2.0	53.10 .25	55.9 0.4
Dec. 4.6	44.35 .18	20.7 1.1	50.59 .20	51.7 0.7	48.08 .45	15.0 2.2	53.34 .22	55.6 0.3
14.5	44.51 +.14	19.6 -1.1	50.77 +.16	51.0 -0.7	48.48 +.34	17.4 +2.4	53.55 +.18	55.3 -0.3
24.5	44.62 .10	18.5 1.0	50.90 .12	50.3 0.6	48.76 .22	19.8 2.5	53.70 .14	55.0 -0.2
34.5	44.70 +.05	17.5 -0.8	51.00 +.08	49.8 -0.5	48.93 +.10	22.4 +2.6	53.82 +.10	54.9 0.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Argus. (Canopus.)		$\gamma$ Geminorum.		$\epsilon$ Canis Majoris. (Sirius.)		$\epsilon$ Canis Majoris.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 6 21	<sup>°</sup> <sup>'</sup> —52 38	<sup>h</sup> <sup>m</sup> 6 31	<sup>°</sup> <sup>'</sup> +16 29	<sup>h</sup> <sup>m</sup> 6 40	<sup>°</sup> <sup>'</sup> —16 34	<sup>h</sup> <sup>m</sup> 6 54	<sup>°</sup> <sup>'</sup> —28 49
(Dec. 30.5)	43.95 +.08	22.3 —3.6	51.68 +.18	12.2 —0.5	41.48 +.10	31.7 —2.4	39.29 +.11	58.6 —3.0
Jan. 9.5	43.93 —.05	25.8 3.4	51.77 .07	11.8 0.4	41.55 +.05	34.1 2.3	39.37 +.05	61.6 2.9
19.4	43.84 .18	29.1 3.1	51.82 +.02	11.4 0.3	41.58 .00	36.4 2.1	39.39 .00	64.4 2.7
29.4	43.68 .19	32.1 2.8	51.81 —.03	11.1 0.2	41.55 —.05	38.4 1.9	39.36 —.06	67.0 2.4
Feb. 8.4	43.46 .24	34.6 2.4	51.76 .07	10.9 0.1	41.48 .09	40.2 1.6	39.28 .10	69.2 2.1
18.4	43.19 —.29	36.8 —1.9	51.66 —.11	10.8 —0.1	41.37 —.13	41.6 —1.3	39.15 —.14	71.2 —1.8
28.3	42.88 .33	38.4 1.4	51.53 .14	10.8 0.0	41.23 .16	42.8 1.0	38.99 .18	72.8 1.4
Mar. 10.3	42.54 .35	39.6 0.9	51.38 .16	10.8 0.0	41.06 .18	43.6 0.7	38.80 .20	73.9 1.0
20.3	42.18 .36	40.2 —0.4	51.21 .17	10.8 0.0	40.87 .19	44.1 —0.3	38.60 .21	74.7 0.6
30.3	41.83 .35	40.3 +0.2	51.03 .17	10.8 0.0	40.68 .19	44.3 0.0	38.38 .21	75.0 —0.1
Apr. 9.2	41.48 —.34	39.9 +0.7	50.86 —.16	10.8 0.0	40.50 —.18	44.2 +0.3	38.17 —.21	75.0 +0.3
19.2	41.15 .31	39.0 1.2	50.71 .14	10.8 0.0	40.33 .16	43.7 0.6	37.96 .19	74.5 0.7
29.2	40.86 .27	37.6 1.6	50.59 .11	10.8 0.0	40.18 .13	43.0 0.9	37.78 .17	73.7 1.0
May 9.1	40.60 .23	35.7 2.0	50.49 .08	10.9 +0.1	40.06 .10	42.0 1.2	37.63 .14	72.5 1.4
19.1	40.40 .18	33.5 2.4	50.44 —.04	11.0 0.1	39.97 .07	40.7 1.4	37.51 .10	70.9 1.7
29.1	40.25 —.18	31.0 +2.7	50.42 .00	11.1 +0.1	39.92 —.05	39.2 +1.6	37.43 —.06	69.1 +2.0
June 8.0	40.16 —.06	28.1 2.9	50.44 +.04	11.3 0.2	39.90 +.01	37.5 1.8	37.39 —.02	67.0 2.2
18.0	40.13 .00	25.1 3.1	50.51 .08	11.5 0.2	39.93 .05	35.6 1.9	37.39 +.02	64.7 2.4
28.0	40.16 +.06	21.9 3.2	50.61 .12	11.7 0.3	39.99 .09	33.7 2.0	37.42 .06	62.3 2.5
July 8.0	40.25 .12	18.7 3.2	50.75 .16	12.0 0.3	40.10 .12	31.7 2.0	37.51 .10	59.8 2.5
18.0	40.40 +.18	15.6 +3.1	50.93 +.19	12.3 +0.3	40.24 +.15	29.7 +1.9	37.62 +.14	57.3 +2.4
27.9	40.60 .23	12.7 2.9	51.13 .22	12.6 0.3	40.40 .18	27.8 1.8	37.78 .17	55.0 2.3
Aug. 6.9	40.86 .28	9.9 2.6	51.36 .24	12.8 0.2	40.60 .21	26.1 1.6	37.97 .20	52.7 2.1
16.9	41.16 .32	7.6 2.2	51.61 .26	13.0 +0.1	40.83 .23	24.6 1.4	38.18 .23	50.7 1.8
26.8	41.49 .35	5.6 1.7	51.88 .28	13.1 0.0	41.07 .25	23.4 1.1	38.43 .26	49.1 1.5
Sept. 5.8	41.86 +.38	4.2 +1.1	52.17 +.29	13.1 —0.1	41.34 +.27	22.5 +0.7	38.70 +.28	47.8 +1.1
15.8	42.25 .40	3.3 +0.5	52.47 .30	13.0 0.2	41.61 .28	22.0 +0.3	38.99 .29	47.0 +0.6
25.8	42.66 .41	3.1 —0.1	52.78 .31	12.8 0.3	41.90 .29	22.0 —0.2	39.29 .31	46.7 0.0
Oct. 5.7	43.07 .41	3.5 0.7	53.09 .31	12.4 0.5	42.20 .30	22.3 0.6	39.60 .31	46.9 —0.3
15.7	43.48 .40	4.5 1.4	53.40 .31	11.8 0.6	42.50 .30	23.2 1.1	39.92 .31	47.7 1.0
25.7	43.87 +.38	6.2 —1.9	53.71 +.31	11.2 —0.7	42.79 +.29	24.4 —1.5	40.23 +.31	49.0 —1.5
Nov. 4.7	44.23 .35	8.4 2.5	54.01 .30	10.5 0.7	43.08 .28	26.1 1.8	40.54 .30	50.8 2.0
14.6	44.56 .31	11.1 2.9	54.30 .28	9.7 0.8	43.34 .26	28.1 2.1	40.83 .28	53.0 2.4
24.6	44.84 .26	14.2 3.3	54.57 .26	8.9 0.8	43.59 .24	30.3 2.3	41.10 .25	55.5 2.7
Dec. 4.6	45.07 .20	17.7 3.5	54.81 .23	8.1 0.8	43.81 .21	32.8 2.5	41.34 .22	58.3 2.9
14.5	45.23 +.13	21.3 —3.6	55.02 +.19	7.4 —0.7	44.00 +.17	35.3 —2.5	41.54 +.18	61.3 —3.0
24.5	45.33 +.06	24.9 3.6	55.18 .14	6.8 0.6	44.15 .12	37.8 2.5	41.69 .13	64.4 3.1
34.5	45.35 —.01	28.5 —3.5	55.31 +.09	6.2 —0.6	44.25 +.07	40.4 —2.4	41.80 +.09	67.5 —3.1

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Canis Majoris.		$\delta$ Geminorum.		Piazzi vii, 67.		$\delta$ Geminorum. (Castor.)	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 7 4	° ' -26 13	h m 7 14	° ' +22 10	h m 7 20	° ' +68 40	h m 7 28	° ' +32 6
(Dec. 30.5)	16.85 +.12	50.5 -2.9	4.51 +.17	11.2 -0.3	22.18 +.33	23.6 +2.3	8.45 +.20	42.2 +0.2
Jan. 9.5	16.94 .06	53.4 2.8	4.65 .12	11.0 -0.2	22.46 .21	26.0 2.4	8.62 .14	42.5 0.4
19.5	16.97 +.01	56.1 2.6	4.74 .06	10.9 0.0	22.61 +.08	28.4 2.5	8.73 .08	43.0 0.6
29.4	16.96 -.04	58.6 2.4	4.78 +.01	10.9 +0.1	22.63 -.04	30.9 2.4	8.78 +.02	43.6 0.7
Feb. 8.4	16.89 .09	60.9 2.1	4.76 -.04	11.1 0.2	22.52 .16	33.3 2.3	8.77 -.05	44.3 0.7
18.4	16.78 -.13	62.8 -1.7	4.70 -.09	11.3 +0.2	22.30 -.27	35.3 +2.1	8.71 -.08	45.0 +0.7
28.4	16.63 .16	64.4 1.4	4.59 .12	11.5 0.3	21.97 .37	37.5 1.7	8.61 .13	45.7 0.7
Mar. 10.3	16.45 .19	65.6 1.0	4.45 .15	11.8 0.3	21.57 .44	39.0 1.3	8.46 .16	46.4 0.6
20.3	16.26 .20	66.4 0.6	4.29 .17	12.0 0.2	21.10 .48	40.1 0.9	8.29 .18	46.9 0.5
30.3	16.05 .21	66.8 -0.2	4.11 .18	12.2 0.2	20.60 .51	40.8 +0.4	8.10 .19	47.3 0.3
Apr. 9.3	15.85 -.20	66.8 +0.2	3.94 -.17	12.4 +0.1	20.09 -.50	41.0 -0.1	7.91 -.19	47.5 +0.2
19.2	15.65 .19	66.4 0.6	3.77 .16	12.5 +0.1	19.59 .48	40.6 0.6	7.72 .18	47.6 0.0
29.2	15.48 .16	65.7 0.9	3.62 .13	12.5 0.0	19.13 .43	39.8 1.0	7.55 .15	47.5 -0.2
May 9.2	15.33 .13	64.6 1.3	3.50 .10	12.4 -0.1	18.73 .36	38.6 1.4	7.41 .12	47.3 0.3
19.1	15.21 .10	63.2 1.6	3.42 .07	12.4 0.1	18.40 .28	37.0 1.8	7.30 .09	46.9 0.4
29.1	15.12 -.06	61.5 +1.8	3.37 -.03	12.2 -0.1	18.16 -.20	35.0 -2.1	7.23 -.05	46.4 -0.5
June 8.1	15.08 -.03	59.5 2.0	3.35 +.01	12.1 0.2	18.01 -.10	32.8 2.3	7.21 -.01	45.8 0.6
18.1	15.07 +.01	57.4 2.2	3.38 .05	11.9 0.2	17.96 .00	30.3 2.5	7.22 +.04	45.1 0.7
28.0	15.11 .05	55.1 2.3	3.45 .09	11.8 0.2	18.01 +.10	27.7 2.6	7.28 .08	44.4 0.8
July 8.0	15.18 .09	52.8 2.3	3.55 .12	11.6 0.2	18.16 .20	25.1 2.7	7.38 .12	43.6 0.8
18.0	15.29 +.13	50.4 +2.3	3.69 +.16	11.4 -0.2	18.41 +.29	22.4 -2.6	7.51 +.15	42.7 -0.8
28.0	15.44 .16	48.1 2.2	3.87 .19	11.2 0.2	18.74 .38	19.8 2.6	7.68 .19	41.9 0.9
Aug. 6.9	15.62 .19	46.0 2.0	4.07 .21	10.9 0.3	19.16 .46	17.3 2.5	7.89 .22	41.0 0.9
16.9	15.83 .22	44.0 1.8	4.30 .24	10.6 0.3	19.66 .53	14.9 2.3	8.12 .25	40.1 0.9
26.9	16.06 .25	42.4 1.4	4.55 .26	10.2 0.4	20.22 .59	12.7 2.1	8.38 .27	39.2 0.9
Sept. 5.8	16.32 +.27	41.2 +1.0	4.82 +.28	9.8 -0.5	20.84 +.65	10.8 -1.8	8.67 +.30	38.3 -0.9
15.8	16.60 .29	40.4 0.6	5.11 .30	9.3 0.6	21.51 .69	9.1 1.5	8.97 .32	37.4 0.9
25.8	16.89 .30	40.1 +0.1	5.41 .31	8.7 0.7	22.22 .73	7.7 1.2	9.30 .33	36.5 0.9
Oct. 5.8	17.20 .31	40.3 -0.5	5.73 .32	8.0 0.7	22.97 .75	6.7 0.9	9.64 .35	35.6 0.9
15.7	17.51 .31	41.0 1.0	6.05 .33	7.2 0.8	23.73 .76	6.0 0.5	9.99 .36	34.7 0.9
25.7	17.82 +.31	42.3 -1.5	6.39 +.33	6.4 -0.8	24.49 +.76	5.7 -0.1	10.35 +.36	33.9 -0.8
Nov. 4.7	18.13 .30	43.9 1.9	6.71 .33	5.6 0.8	25.25 .74	5.8 +0.3	10.71 .36	33.1 0.7
14.7	18.43 .29	46.1 2.3	7.04 .32	4.7 0.8	25.98 .71	6.3 0.7	11.07 .35	32.4 0.6
24.6	18.70 .26	48.5 2.6	7.34 .30	3.9 0.8	26.68 .66	7.3 1.1	11.41 .33	31.9 0.4
Dec. 4.6	18.95 .23	51.3 2.8	7.63 .27	3.2 0.7	27.30 .59	8.6 1.5	11.72 .30	31.6 0.3
14.6	19.16 +.19	54.2 -2.9	7.88 +.23	2.6 -0.6	27.86 +.50	10.3 +1.8	12.01 +.27	31.4 -0.1
24.5	19.32 .14	57.1 3.0	8.10 .19	2.1 0.4	28.31 .40	12.3 2.1	12.26 .22	31.4 +0.1
34.5	19.44 +.10	60.1 -3.0	8.27 +.15	1.8 -0.2	28.66 +.29	14.6 +2.3	12.45 +.18	31.7 +0.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date	$\alpha$ Canis Minoris, (Procyon.)		$\beta$ Geminorum, (Pollux.)		$\phi$ Geminorum.		3 Ursæ Majoris (H.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 7 33	° ' " + 5 28	h m 7 39	° ' " +28 16	h m 7 47	° ' " +27 1	h m 8 2	° ' " +68 46
(Dec. 30.5)	60.14 +.16	69.5 -1.4	7.22 +.20	18.0 0.0	18.01 +.21	43.9 -0.2	45.87 +.44	19.7 +2.0
Jan. 9.5	60.29 .12	68.1 1.3	7.40 .13	18.0 +0.1	18.19 .16	43.9 0.0	46.25 .32	21.8 2.3
19.5	60.39 .07	66.8 1.1	7.52 .09	18.3 0.3	18.32 .10	44.0 +0.2	46.50 .19	24.2 2.5
29.5	60.43 +.02	65.8 0.9	7.58 +.04	18.6 0.4	18.39 +.04	44.3 0.4	46.63 +.06	26.7 2.5
Feb. 8.4	60.43 -.02	65.0 -0.8	7.58 -.02	19.1 0.5	18.40 -0.01	44.7 0.5	46.63 -.06	29.2 2.5
18.4	60.38 -.07	64.3 -0.6	7.54 -.07	19.7 +0.6	18.37 -.06	45.2 +0.5	46.50 -.18	31.6 +2.3
28.4	60.29 .11	63.8 0.4	7.44 .11	20.2 0.6	18.28 .10	45.7 0.5	46.26 .29	33.9 2.1
Mar. 10.3	60.16 .14	63.5 0.3	7.31 .13	20.8 0.5	18.16 .14	46.3 0.5	45.92 .38	35.8 1.8
20.3	60.02 .13	63.3 -0.1	7.15 .17	21.3 0.4	18.00 .16	46.8 0.5	45.50 .44	37.4 1.4
30.3	59.86 .16	63.2 0.0	6.97 .18	21.7 0.4	17.83 .17	47.2 0.4	45.03 .49	38.6 0.9
Apr. 9.3	59.69 -.16	63.3 +0.1	6.78 -.18	22.0 +0.2	17.65 -.18	47.6 +0.3	44.53 -.30	39.3 +0.5
19.2	59.53 .13	63.5 0.2	6.61 .17	22.2 +0.1	17.48 .17	47.8 +0.1	44.03 .50	39.5 0.0
29.2	59.39 .13	63.7 0.3	6.44 .15	22.2 0.0	17.32 .15	47.9 0.0	43.54 .47	39.2 -0.5
May 9.2	59.27 .11	64.0 0.4	6.30 .12	22.1 -0.1	17.18 .12	47.8 0.0	43.08 .42	38.5 1.0
19.2	59.17 .08	64.4 0.5	6.20 .09	21.9 0.3	17.07 .09	47.7 -0.2	42.69 .36	37.2 1.4
29.1	59.11 -.03	65.0 +0.6	6.12 -.06	21.6 -0.4	16.99 -.06	47.5 -0.3	42.37 -.28	35.6 -1.8
June 8.1	59.08 -.01	65.6 0.6	6.08 -.02	21.2 0.4	16.95 -.02	47.1 0.4	42.13 .20	33.7 2.1
18.1	59.08 +.02	66.2 0.7	6.09 +.02	20.7 0.5	16.95 +.02	46.7 0.4	41.98 .11	31.4 2.4
28.0	59.12 .06	66.9 0.7	6.13 .06	20.2 0.6	16.98 .06	46.2 0.5	41.92 -.01	28.9 2.6
July 8.0	59.19 .09	67.6 0.7	6.21 .10	19.6 0.6	17.06 .09	45.7 0.6	41.96 +.08	26.2 2.7
18.0	59.30 +.12	68.3 +0.7	6.33 +.14	19.0 -0.7	17.17 +.13	45.1 -0.6	42.09 +.18	23.5 -2.8
28.0	59.44 .15	68.9 0.6	6.48 .17	18.3 0.7	17.31 .16	44.5 0.7	42.31 .27	20.7 2.8
Aug. 6.9	59.60 .18	69.5 0.5	6.67 .20	17.6 0.7	17.49 .19	43.8 0.7	42.62 .35	17.9 2.8
16.9	59.79 .20	69.9 0.4	6.88 .23	16.8 0.8	17.69 .22	43.1 0.8	43.01 .43	15.1 2.7
26.9	60.00 .23	70.2 +0.2	7.12 .25	16.0 0.8	17.92 .24	42.3 0.8	43.48 .50	12.5 2.5
Sept. 5.9	60.24 +.25	70.3 0.0	7.39 +.28	15.2 -0.9	18.18 +.27	41.5 -0.9	44.02 +.57	10.1 -2.3
15.8	60.49 .26	70.2 -0.2	7.68 .30	14.3 0.9	18.46 .29	40.6 0.9	44.62 .63	7.8 2.1
25.8	60.77 .28	69.9 0.5	7.98 .32	13.4 0.9	18.76 .31	39.6 1.0	45.27 .68	5.9 1.8
Oct. 5.8	61.05 .29	69.2 0.7	8.31 .33	12.4 1.0	19.08 .33	38.6 1.0	45.97 .72	4.2 1.5
15.7	61.35 .30	68.4 1.0	8.64 .34	11.4 1.0	19.41 .34	37.6 1.0	46.71 .75	2.9 1.1
25.7	61.65 +.31	67.3 -1.2	8.99 +.35	10.5 -0.9	19.75 +.34	36.5 -1.0	47.47 +.76	2.0 -0.7
Nov. 4.7	61.96 .31	66.0 1.4	9.34 .35	9.6 0.9	20.10 .35	35.5 1.0	48.23 .76	1.4 -0.3
14.7	62.26 .30	64.6 1.3	9.68 .34	8.7 0.8	20.44 .34	34.6 0.9	49.00 .75	1.3 +0.1
24.6	62.56 .28	63.0 1.6	10.02 .32	8.0 0.7	20.78 .33	33.7 0.8	49.73 .71	1.7 0.6
Dec. 4.6	62.83 .26	61.4 1.6	10.33 .30	7.4 0.5	21.10 .30	33.0 0.6	50.42 .66	2.5 1.0
14.6	63.08 +.23	59.8 -1.6	10.62 +.27	6.9 -0.4	21.39 +.27	32.4 -0.5	51.05 +.58	3.7 +1.4
24.6	63.29 .19	58.3 1.5	10.86 .22	6.6 -0.2	21.64 .23	32.1 0.3	51.59 .49	5.3 1.8
34.5	63.46 +.13	56.7 -1.4	11.06 +.18	6.6 0.0	21.85 +.19	31.9 -0.1	52.03 +.40	7.3 +2.1



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	15 Argûs (ρ).		7 Cancri.		ε Hydrae.		ε Ursae Majoris.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 8 3	<sup>°</sup> <sup>'</sup> -24 0	<sup>h</sup> <sup>m</sup> 8 26	<sup>°</sup> <sup>'</sup> +20 46	<sup>h</sup> <sup>m</sup> 8 41	<sup>°</sup> <sup>'</sup> + 6 47	<sup>h</sup> <sup>m</sup> 8 52	<sup>°</sup> <sup>'</sup> +48 26
(Dec. 30.6)	<sup>s</sup> 14.12 +.19	<sup>"</sup> 35.1 -2.9	<sup>s</sup> 51.14 +.24	<sup>"</sup> 70.0 -0.6	<sup>s</sup> 24.70 +.23	<sup>"</sup> 31.0 -1.5	<sup>s</sup> 16.70 +.33	<sup>"</sup> 20.5 +0.6
Jan. 9.5	14.28 .13	38.0 2.9	51.35 .19	69.4 0.5	24.91 .19	29.5 1.4	17.01 .27	21.3 1.0
19.5	14.38 .08	40.9 2.8	51.51 .14	69.0 0.3	25.07 .14	28.2 1.2	17.25 .21	22.4 1.3
29.5	14.43 +.03	43.6 2.6	51.62 .08	68.8 -0.1	25.18 .09	27.1 1.0	17.42 .13	23.8 1.5
Feb. 8.5	14.43 -.03	46.0 2.3	51.68 +.03	68.8 +0.1	25.25 +.04	26.2 0.8	17.52 +.06	25.4 1.6
18.4	14.38 -.07	48.2 -2.0	51.68 -.02	69.0 +0.2	25.26 -.01	25.5 -0.6	17.54 -.01	27.1 +1.7
28.4	14.28 .11	50.1 1.7	51.63 .07	69.3 0.3	25.23 .05	25.1 0.4	17.49 .08	28.9 1.7
Mar. 10.4	14.15 .14	51.6 1.3	51.55 .10	69.7 0.4	25.15 .09	24.8 -0.2	17.38 .13	30.6 1.6
20.4	13.99 .17	52.8 1.0	51.42 .13	70.1 0.4	25.05 .12	24.7 0.0	17.22 .18	32.1 1.5
30.3	13.82 .18	53.6 0.6	51.28 .13	70.6 0.4	24.92 .14	24.7 +0.1	17.02 .21	33.5 1.2
Apr. 9.3	13.63 -.18	54.0 -0.3	51.12 -.16	71.0 +0.4	24.78 -.14	24.9 +0.2	16.80 -.23	34.5 +0.9
19.3	13.44 .18	54.1 +0.1	50.96 .16	71.4 0.4	24.63 .15	25.1 0.3	16.55 .24	35.3 0.6
29.3	13.27 .17	53.8 0.5	50.81 .15	71.7 0.3	24.48 .14	25.4 0.3	16.31 .24	35.8 +0.3
May 9.2	13.11 .13	53.2 0.8	50.66 .13	71.9 0.2	24.35 .13	25.8 0.4	16.08 .22	35.8 -0.1
19.2	12.97 .13	52.2 1.1	50.54 .11	72.1 +0.1	24.23 .11	26.2 0.4	15.88 .19	35.6 0.4
29.2	12.85 -.10	51.0 +1.4	50.45 -.08	72.2 0.0	24.14 -.08	26.7 +0.5	15.70 -.16	35.0 -0.7
June 8.1	12.77 .07	49.5 1.6	50.38 .05	72.2 -0.0	24.07 .06	27.2 0.5	15.56 .12	34.1 1.0
18.1	12.72 -.03	47.7 1.8	50.35 -.02	72.1 0.1	24.02 -.03	27.7 0.5	15.46 .08	33.0 1.3
28.1	12.71 .00	45.8 2.0	50.35 +.02	72.0 0.2	24.01 .00	28.2 0.5	15.40 -.04	31.5 1.5
July 8.1	12.73 +.04	43.8 2.1	50.38 .05	71.8 0.2	24.03 +.03	28.7 0.5	15.39 +.01	29.9 1.7
18.0	12.79 +.07	41.7 +2.1	50.45 +.08	71.5 -0.3	24.07 +.06	29.2 +0.5	15.42 +.06	28.1 -1.9
28.0	12.88 .11	39.6 2.1	50.55 .11	71.1 0.4	24.15 .09	29.6 0.4	15.50 .10	26.1 2.0
Ang. 7.0	13.00 .14	37.5 1.9	50.67 .14	70.7 0.5	24.25 .12	30.0 0.3	15.63 .15	24.0 2.1
17.0	13.15 .17	35.7 1.7	50.83 .17	70.1 0.6	24.38 .14	30.2 +0.1	15.80 .19	21.9 2.2
26.9	13.34 .20	34.1 1.5	51.01 .20	69.4 0.7	24.54 .17	30.2 0.0	16.00 .23	19.7 2.2
Sept. 5.9	13.55 +.23	32.7 +1.1	51.23 +.23	68.7 -0.8	24.72 +.20	30.1 -0.2	16.25 +.27	17.5 -2.2
15.9	13.79 .23	31.8 0.7	51.46 .25	67.8 1.0	24.93 .22	29.8 0.4	16.54 .31	15.3 2.2
25.8	14.06 .28	31.3 +0.3	51.74 .26	66.7 1.1	25.17 .25	29.3 0.7	16.87 .34	13.2 2.1
Oct. 5.8	14.34 .30	31.2 -0.2	52.01 .29	65.6 1.2	25.43 .27	28.5 0.9	17.23 .38	11.2 2.0
15.8	14.65 .31	31.6 0.7	52.32 .31	64.4 1.3	25.71 .29	27.5 1.1	17.62 .41	9.3 1.8
25.8	14.97 +.32	32.6 -1.2	52.64 +.33	63.1 -1.3	26.01 +.31	26.2 -1.4	18.04 +.43	7.6 -1.6
Nov. 4.7	15.29 .32	34.0 1.6	52.97 .34	61.7 1.4	26.32 .32	24.8 1.5	18.48 .44	6.1 1.3
14.7	15.61 .31	35.8 2.0	53.31 .34	60.3 1.4	26.64 .32	23.2 1.7	18.93 .45	4.9 1.0
24.7	15.92 .30	38.1 2.4	53.65 .33	59.0 1.3	26.96 .32	21.4 1.8	19.38 .45	4.0 0.7
Dec. 4.7	16.21 .28	40.6 2.7	53.97 .31	57.7 1.2	27.28 .30	19.7 1.8	19.82 .43	3.5 -0.3
14.6	16.47 +.24	43.4 -2.9	54.28 +.29	56.6 -1.0	27.57 +.26	17.9 -1.7	20.24 +.40	3.3 0.0
24.6	16.70 .20	46.3 2.9	54.55 .26	55.7 0.8	27.84 .25	16.2 1.6	20.62 .36	3.6 +0.4
34.6	16.88 +.17	49.3 -2.8	54.79 +.23	54.9 -0.5	28.07 +.22	14.6 -1.5	20.96 +.31	4.2 +0.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♂ Ursæ Majoris.		♂ Cancr.		♂ Argus.		♂ Draconis (H.)	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	h m 9 1	° ' +67 32	h m 9 2	° ' +11 4	h m 9 14	° ' -58 50	h m 9 22	° ' +81 46
(Dec. 30.6)	30.26 +.33	42.0 +1.5	15.59 +.25	38.0 -1.4	23.59 +.32	40.4 -3.6	44.72 +1.32	22.1 +1.8
Jan. 9.6	30.75 .43	43.6 1.8	15.82 .21	36.7 1.2	23.88 .25	44.1 3.8	45.94 1.09	24.1 2.2
19.6	31.13 .32	45.6 2.2	16.01 .16	35.6 1.0	24.09 .17	47.9 3.9	46.90 .82	26.5 2.5
29.5	31.39 .20	47.9 2.4	16.15 .11	34.7 0.8	24.22 +.08	51.8 3.9	47.58 .53	29.2 2.8
Feb. 8.5	31.53 +.08	50.4 2.5	16.23 .06	34.0 0.5	24.26 .00	55.6 3.8	47.96 +.22	32.1 2.9
18.5	31.55 -.04	53.0 +2.5	16.27 +.01	33.6 -0.3	24.22 -.08	59.3 -3.6	48.03 -.09	35.0 +2.9
28.4	31.45 .15	55.5 2.4	16.25 -.03	33.4 -0.1	24.11 .15	62.8 3.3	47.78 .39	38.0 2.9
Mar. 10.4	31.25 .25	57.8 2.3	16.20 .07	33.3 0.0	23.92 .21	65.9 3.0	47.25 .66	40.7 2.7
20.4	30.95 .33	60.0 2.0	16.11 .10	33.4 +0.1	23.68 .26	68.7 2.6	46.47 .90	43.2 2.3
30.4	30.58 .40	61.8 1.6	15.99 .13	33.6 0.2	23.39 .30	71.1 2.1	45.46 1.09	45.4 1.9
Apr. 9.3	30.15 -.44	63.2 +1.2	15.86 -.14	33.9 +0.3	23.07 -.33	73.0 -1.7	44.29 -1.23	47.0 +1.4
19.3	29.69 .46	64.1 0.7	15.72 .14	34.2 0.4	22.73 .35	74.5 1.2	43.00 1.32	48.2 0.9
29.3	29.23 .46	64.5 +0.2	15.57 .14	34.6 0.4	22.37 .36	75.4 0.7	41.64 1.36	48.8 +0.3
May 9.3	28.77 .44	64.5 -0.3	15.44 .13	35.0 0.4	22.02 .35	75.8 -0.2	40.28 1.35	48.8 -0.3
19.2	28.34 .41	63.9 0.8	15.32 .11	35.4 0.4	21.67 .34	75.7 +0.4	38.95 1.28	48.3 0.8
29.2	27.96 -.35	63.0 -1.2	15.21 -.09	35.8 +0.4	21.34 -.32	75.1 +0.8	37.71 -1.18	47.2 -1.3
June 8.2	27.63 .29	61.5 1.6	15.13 .07	36.2 0.4	21.04 .29	74.0 1.3	36.59 1.04	45.6 1.8
18.1	27.38 .22	59.7 2.0	15.08 .04	36.5 0.3	20.77 .25	72.5 1.7	35.63 .87	43.5 2.3
28.1	27.20 .14	57.6 2.3	15.05 -.01	36.8 0.3	20.55 .20	70.5 2.1	34.85 .68	41.1 2.6
July 8.1	27.09 -.06	55.2 2.6	15.05 +.02	37.1 0.2	20.37 .15	68.2 2.5	34.27 .47	38.3 2.9
18.1	27.07 +.02	52.5 -2.8	15.08 +.04	37.3 +0.2	20.25 -.09	65.6 +2.7	33.91 -.25	35.2 -3.2
28.0	27.13 .10	49.6 2.9	15.14 .07	37.5 +0.1	20.18 -.03	62.8 2.9	33.77 -.02	31.9 3.4
Aug. 7.0	27.27 .12	46.7 3.0	15.23 .10	37.5 0.0	20.18 +.03	59.9 2.9	33.86 +.20	28.5 3.5
17.0	27.49 .26	43.7 3.0	15.34 .13	37.4 -0.2	20.24 .10	57.0 2.9	34.18 .43	25.0 3.3
27.0	27.79 .34	40.7 3.0	15.48 .16	37.2 0.3	20.37 .16	54.1 2.7	34.72 .65	21.5 3.4
Sept. 5.9	28.17 +.41	37.7 -2.9	15.65 +1.18	36.8 -0.5	20.57 +.23	51.5 +2.4	35.47 +.86	18.1 -3.3
15.9	28.61 .48	34.9 2.7	15.85 .21	36.2 0.7	20.83 .29	49.1 2.1	36.43 1.05	14.8 3.2
25.9	29.13 .54	32.2 2.5	16.07 .24	35.4 0.9	21.16 .35	47.2 1.7	37.58 1.23	11.7 2.9
Oct. 5.8	29.70 .60	29.8 2.3	16.32 .26	34.5 1.1	21.54 .41	45.7 1.2	38.89 1.40	9.0 2.6
15.8	30.33 .65	27.7 2.0	16.60 .29	33.3 1.3	21.97 .45	44.8 +0.6	40.36 1.53	6.5 2.2
25.8	31.00 +.69	25.8 -1.6	16.89 +.31	31.9 -1.5	22.44 +.48	44.5 0.0	41.96 +1.64	4.5 -1.8
Nov. 4.8	31.70 .71	24.4 1.2	17.21 .32	30.4 1.6	22.94 .50	44.9 -0.7	43.65 1.72	2.9 1.5
14.7	32.42 .72	23.4 0.8	17.53 .33	28.7 1.7	23.45 .50	45.9 1.3	45.40 1.76	1.8 0.8
24.7	33.14 .71	22.8 -0.3	17.86 .33	27.0 1.7	23.95 .49	47.6 2.0	47.16 1.75	1.3 -0.2
Dec. 4.7	33.85 .69	22.8 +0.2	18.18 .32	25.2 1.7	24.44 .47	49.8 2.5	48.90 1.70	1.3 +0.3
14.7	34.52 +.64	23.3 +0.7	18.49 +.30	23.5 -1.6	24.89 +.42	52.6 -3.0	50.55 +1.59	1.9 +0.9
24.6	35.13 .57	24.2 1.2	18.78 .26	22.0 1.5	25.28 .36	55.7 3.3	52.08 1.43	3.1 1.4
34.6	35.67 +.50	25.6 +1.7	19.03 +.23	20.6 -1.3	25.62 +.30	59.2 -3.6	53.42 +1.23	4.8 +2.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♌ Hydra.		♊ Ursæ Majoris.		♊ Ursæ Majoris.		♌ Leonis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 9 22	° ' " — 8 12	h m 9 25	° ' " +70 16	h m 9 26	° ' " +52 7	h m 9 40	° ' " +24 14
(Dec. 30.6)	36.43 +.23	61.3 -2.3	33.08 +.64	26.8 +1.3	5.28 +.40	77.3 +0.5	5.93 +.30	27.6 -0.9
Jan. 9.6	36.67 .21	63.7 2.2	33.66 .33	28.4 1.8	5.64 .33	78.0 0.9	6.21 .26	26.8 0.6
19.6	36.86 .17	65.9 2.1	34.13 .41	30.3 2.1	5.94 .26	79.1 1.3	6.45 .21	26.3 0.3
29.5	37.00 .12	67.9 2.0	34.48 .26	32.6 2.4	6.16 .19	80.6 1.6	6.64 .16	26.1 -0.1
Feb. 8.5	37.10 .27	69.8 1.8	34.69 .13	35.2 2.6	6.31 .11	82.3 1.8	6.77 .11	26.2 +0.2
18.5	37.15 +.02	71.4 -1.5	34.77 +.01	37.8 +2.6	6.38 +.03	84.2 +1.9	6.85 +.03	26.5 +0.4
28.4	37.15 -.02	72.8 1.2	34.71 -.12	40.5 2.6	6.38 -.04	86.1 2.0	6.87 .00	27.1 0.6
Mar. 10.4	37.10 .06	73.9 1.0	34.53 .24	43.1 2.5	6.30 .11	88.1 1.9	6.85 -.04	27.8 0.7
20.4	37.02 .09	74.8 0.7	34.24 .34	45.4 2.2	6.16 .16	90.0 1.8	6.79 .08	28.6 0.3
30.4	36.92 .11	75.4 0.5	33.85 .42	47.5 1.9	5.97 .21	91.7 1.6	6.69 .11	29.4 0.3
Apr. 9.3	36.80 -.13	75.8 -0.2	33.39 -.48	49.2 +1.4	5.74 -.24	93.1 +1.3	6.56 -.13	30.2 +0.3
19.3	36.66 .14	75.9 0.0	32.89 .52	50.4 0.9	5.49 .26	94.3 1.0	6.42 .14	31.0 0.7
29.3	36.52 .24	75.8 +0.2	32.36 .53	51.1 +0.5	5.23 .26	95.0 0.6	6.27 .15	31.7 0.6
May 9.3	36.38 .13	75.5 0.4	31.83 .52	51.3 0.0	4.97 .25	95.4 +0.2	6.13 .14	32.2 0.3
19.2	36.26 .12	75.1 0.5	31.31 .49	51.0 -0.5	4.73 .23	95.4 -0.2	5.99 .13	32.7 0.4
29.2	36.15 -.10	74.4 +0.7	30.84 -.45	50.3 -1.0	4.51 -.21	95.1 -0.6	5.87 -.11	33.0 +0.2
June 8.2	36.05 .08	73.7 0.9	30.42 .39	49.0 1.5	4.32 .17	94.3 0.9	5.76 .09	33.1 +0.1
18.1	35.98 .06	72.7 1.0	30.07 .31	47.3 1.9	4.16 .13	93.2 1.3	5.68 .07	33.1 0.0
28.1	35.93 .04	71.7 1.1	29.79 .24	45.2 2.2	4.05 .09	91.8 1.6	5.62 .05	32.9 -0.2
July 8.1	35.91 -.01	70.6 1.1	29.60 .15	42.8 2.5	3.98 -.05	90.1 1.8	5.59 -.08	32.6 0.4
18.1	35.91 +.01	69.5 +1.1	29.49 -.06	40.2 -2.3	3.96 .00	88.2 -2.0	5.58 +.01	32.1 -0.6
28.0	35.94 .04	68.3 1.1	29.48 +.03	37.2 3.0	3.98 +.05	86.1 2.2	5.60 .04	31.4 0.7
Aug. 7.0	36.00 .07	67.2 1.0	29.55 .12	34.2 3.1	4.06 .09	83.8 2.4	5.66 .07	30.6 0.9
17.0	36.08 .10	66.2 0.9	29.72 .21	31.0 3.2	4.17 .14	81.3 2.5	5.74 .10	29.7 1.0
27.0	36.19 .13	65.4 0.7	29.98 .30	27.8 3.2	4.34 .19	78.8 2.5	5.85 .13	28.6 1.2
Sept. 5.9	36.33 +.16	64.8 +0.5	30.32 +.39	24.6 -3.1	4.55 +.23	76.2 -2.6	5.99 +.16	27.4 -1.3
15.9	36.51 .19	64.4 +0.2	30.75 .47	21.5 3.0	4.81 .22	73.6 2.6	6.17 .19	26.0 1.4
25.9	36.71 .22	64.3 -0.1	31.27 .55	18.6 2.8	5.11 .22	71.1 2.5	6.37 .22	24.5 1.6
Oct. 5.8	36.94 .25	64.6 0.4	31.85 .62	15.9 2.6	5.45 .26	68.7 2.4	6.61 .25	22.8 1.7
15.8	37.20 .27	65.2 0.8	32.51 .68	13.4 2.3	5.84 .40	66.4 2.2	6.88 .28	21.1 1.8
25.8	37.48 +.29	66.2 -1.1	33.22 +.73	11.3 -1.9	6.26 +.43	64.2 -2.0	7.18 +.31	19.3 -1.8
Nov. 4.8	37.79 .31	67.5 1.5	33.98 .77	9.5 1.5	6.70 .46	62.4 1.7	7.50 .33	17.4 1.8
14.7	38.11 .32	69.1 1.8	34.76 .80	8.2 1.1	7.17 .47	60.8 1.4	7.84 .34	15.6 1.8
24.7	38.43 .32	71.0 2.0	35.57 .80	7.4 -0.6	7.65 .48	59.6 1.0	8.19 .35	13.8 1.7
Dec. 4.7	38.75 .31	73.1 2.2	36.36 .78	7.1 0.0	8.13 .47	58.8 0.6	8.54 .35	12.2 1.6
14.7	39.06 +.30	75.4 -2.3	37.12 +.74	7.3 +0.5	8.59 +.45	58.3 -0.2	8.89 +.34	10.7 -1.4
24.6	39.35 .27	77.8 2.3	37.84 .67	8.1 1.0	9.03 .41	58.4 +0.2	9.21 .31	9.5 1.1
34.6	39.60 +.24	80.1 -2.2	38.47 +.60	9.3 +1.5	9.42 +.37	58.8 +0.7	9.51 +.28	8.5 -0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON

Mean Solar Date.	$\mu$ Leonis.		$\alpha$ Leonis. (Regulus.)		32 Ursæ Majoris.		$\gamma^1$ Leonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 9 46	° ' " +26 28	h m 10 2	° ' " +12 27	h m 10 10	° ' " +65 36	h m 10 14	° ' " +20 20
(Dec. 30.6)	60.00 +.30	63.4 -0.8	58.34 +.30	48.1 -1.6	41.60 +.39	41.8 +0.6	22.93 +.31	76.1 -2.3
Jan. 9.6	60.29 .27	62.7 0.6	58.62 .26	46.6 1.4	42.15 .32	42.7 1.1	23.23 .28	74.9 2.0
19.6	60.54 .22	62.3 -0.2	58.86 .22	45.4 1.1	42.64 .44	44.1 1.6	23.49 .24	74.0 0.7
29.6	60.73 .17	62.2 +0.1	59.05 .17	44.4 0.8	43.02 .34	45.9 2.0	23.70 .19	73.3 0.4
Feb. 8.5	60.88 .11	62.4 0.3	59.20 .12	43.7 0.6	43.31 .23	48.1 2.3	23.87 .14	73.2 -0.1
18.5	60.96 +.06	62.8 +0.6	59.30 +.07	43.3 -0.3	43.48 +.12	50.5 +2.3	23.98 +.09	73.2 +0.2
28.5	61.00 +.01	63.5 0.7	59.34 +.02	43.1 -0.1	43.55 +.01	53.1 2.6	24.04 +.04	73.5 0.4
Mar. 10.5	60.98 -0.04	64.3 0.9	59.34 -0.02	43.2 +0.1	43.51 -0.09	55.7 2.6	24.06 -0.01	74.0 0.6
20.4	60.92 .08	65.3 0.9	59.30 .06	43.4 0.3	43.36 .19	58.2 2.4	24.03 .05	74.7 0.7
30.4	60.82 .11	66.2 0.9	59.23 .09	43.7 0.4	43.13 .27	60.6 2.2	23.96 .08	75.4 0.8
Apr. 9.4	60.70 -0.13	67.1 +0.9	59.13 -0.11	44.2 +0.5	42.83 -0.33	62.7 +1.9	23.87 -0.10	76.2 +0.8
19.3	60.56 .14	68.0 0.8	59.02 .12	44.7 0.5	42.48 .37	64.4 1.5	23.75 .12	77.0 0.8
29.3	60.41 .15	68.8 0.7	58.89 .12	45.2 0.5	42.09 .40	65.7 1.1	23.62 .13	77.8 0.6
May 9.3	60.26 .15	69.4 0.5	58.77 .12	45.8 0.5	41.68 .41	66.5 0.6	23.49 .13	78.3 0.7
19.3	60.12 .14	69.8 0.4	58.64 .12	46.3 0.5	41.26 .40	66.8 +0.1	23.36 .13	79.1 0.5
29.2	59.99 -0.12	70.1 +0.2	58.53 -0.11	46.8 +0.5	40.87 -0.38	66.7 -0.4	23.24 -0.12	79.6 +0.4
June 8.2	59.87 .10	70.2 0.0	58.43 .09	47.2 0.4	40.50 .35	66.1 0.9	23.13 .10	79.9 0.3
18.2	59.79 .08	70.2 -0.2	58.35 .08	47.6 0.3	40.17 .31	65.0 1.3	23.04 .08	80.1 +0.1
28.2	59.72 .05	69.9 0.3	58.28 .06	47.9 0.3	39.88 .26	63.4 1.7	22.96 .06	80.2 0.0
July 8.1	59.68 -0.05	69.5 0.5	58.24 .03	48.1 0.2	39.65 .20	61.5 2.1	22.91 .04	80.1 -0.2
18.1	59.67 .00	68.9 -0.7	58.21 -0.01	48.2 +0.1	39.48 -0.14	59.3 -2.4	22.88 -0.02	79.8 -0.3
28.1	59.68 +0.05	68.1 0.8	58.21 +0.01	48.2 -0.1	39.38 -0.07	56.7 2.7	22.87 .00	79.4 0.5
Aug. 7.0	59.73 .06	67.2 1.0	58.24 .04	48.1 0.2	39.35 .00	53.9 2.9	22.89 +0.03	78.8 0.7
17.0	59.80 .09	66.2 1.2	58.29 .07	47.8 0.3	39.38 +0.07	50.8 3.1	22.93 .06	78.1 0.8
27.0	59.91 .12	64.9 1.3	58.38 .10	47.4 0.5	39.48 .14	47.7 3.2	23.00 .09	77.2 1.0
Sept. 6.0	60.04 +.15	63.5 -1.5	58.49 +.13	46.8 -0.7	39.66 +.21	44.4 -3.2	23.11 +.12	76.1 -1.2
15.9	60.21 .18	62.0 1.6	58.63 .16	46.0 0.9	39.91 .29	41.2 3.2	23.24 .15	74.8 1.4
25.9	60.41 .22	60.4 1.7	58.80 .19	45.0 1.1	40.24 .36	37.9 3.2	23.41 .18	73.4 1.5
Oct. 5.9	60.65 .25	58.6 1.8	59.00 .22	43.8 1.3	40.63 .43	34.8 3.0	23.61 .22	71.8 1.7
15.9	60.92 .28	56.7 1.9	59.24 .25	42.4 1.5	41.09 .49	31.9 2.8	23.85 .25	70.0 1.8
25.8	61.21 +.31	54.8 -1.9	59.51 +.28	40.8 -1.7	41.61 +.55	29.2 -2.5	24.12 +.28	68.1 -1.9
Nov. 4.8	61.53 .33	52.9 1.9	59.80 .30	39.0 1.8	42.19 .60	26.8 2.2	24.42 .31	66.1 2.0
14.8	61.87 .35	51.0 1.8	60.12 .32	37.1 1.9	42.81 .64	24.9 1.8	24.74 .33	64.1 2.1
24.7	62.23 .36	49.2 1.7	60.45 .33	35.2 1.9	43.46 .66	23.3 1.3	25.07 .34	62.1 2.0
Dec. 4.7	62.59 .36	47.6 1.5	60.78 .33	33.2 1.9	44.13 .66	22.2 0.8	25.42 .35	60.2 1.9
14.7	62.94 +.34	46.1 -1.3	61.12 +.33	31.4 -1.8	44.79 +.65	21.7 -0.3	25.77 +.34	58.4 -1.7
24.7	63.28 .32	44.9 1.0	61.44 .31	29.6 1.7	45.42 .61	21.7 +0.3	26.10 .33	56.8 1.5
34.6	63.59 +.29	44.0 -0.7	61.73 +.28	28.0 -1.5	46.01 +.56	22.3 +0.9	26.42 +.31	55.5 -1.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Draconis. (H.)			ρ Leonis.			η Argus.			δ Leonis.		
	Right Ascension.	Declination North.		Right Ascension.	Declination North.		Right Ascension.	Declination South.		Right Ascension.	Declination North.	
	h m 10 26	° ' " +76 13		h m 10 27	° ' " + 9 49		h m 10 41	° ' " -59 8		h m 10 43	° ' " +11 4	
(Dec. 30.6)	31.92+ .96	56.7 +0.7		28.25 +.31	44.5 -1.8		7.70 +.46	43.6 -3.0		55.49 +.32	56.1 -1.8	
Jan. 9.6	32.84 .86	57.7 1.3		28.54 .27	42.8 1.6		8.14 .40	46.7 3.3		55.79 .29	54.4 1.6	
19.6	33.64 .73	59.3 1.8		28.80 .24	41.4 1.3		8.51 .34	50.2 3.3		56.06 .23	53.0 1.3	
29.6	34.30 .57	61.4 2.3		29.01 .19	40.2 1.1		8.81 .26	53.8 3.7		56.29 .21	51.8 1.0	
Feb. 8.5	34.79 .40	63.9 2.6		29.18 .15	39.2 0.8		9.04 .18	57.6 3.8		56.48 .16	50.9 0.7	
18.5	35.10+ .22	66.6 +2.8		29.30 +.10	38.6 -0.5		9.18 +.11	61.4 -3.8		56.61 +.11	50.4 -0.4	
28.5	35.23+ .03	69.5 2.9		29.38 +.05	38.2 -0.2		9.25 +.03	65.1 3.7		56.70 .07	50.0 -0.1	
Mar. 10.5	35.17- .13	72.4 2.9		29.40 .00	38.1 0.0		9.25 -.04	68.7 3.3		56.74 +.02	50.0 0.0	
20.4	34.93 .31	75.2 2.7		29.39 -.03	38.2 +0.2		9.18 .10	72.1 3.2		56.74 -.02	50.1 +0.2	
30.4	34.54 .46	77.8 2.5		29.34 -.06	38.4 0.3		9.04 .16	75.2 2.9		56.71 -.05	50.4 0.4	
Apr. 9.4	34.02- .58	80.2 +2.1		29.26 -.09	38.8 +0.4		8.86 -.21	77.9 -2.5		56.64 -.08	50.9 +0.5	
19.4	33.38 .67	82.1 1.7		29.16 .10	39.3 0.5		8.63 .24	80.3 2.1		56.56 .09	51.5 0.6	
29.3	32.67 .74	83.5 1.2		29.05 .11	39.8 0.5		8.37 .27	82.2 1.7		56.46 .11	52.1 0.6	
May 9.3	31.91 .77	84.5 0.7		28.93 .12	40.4 0.6		8.08 .29	83.7 1.2		56.34 .11	52.7 0.6	
19.3	31.13 .78	84.9 +0.1		28.82 .12	40.9 0.6		7.78 .31	84.7 0.8		56.23 .11	53.3 0.6	
29.3	30.36- .76	84.7 -0.4		28.70 -.11	41.5 +0.6		7.47 -.31	85.1 -0.2		56.12 -.11	53.9 +0.6	
June 8.2	29.62 .71	84.0 0.9		28.60 .10	42.0 0.5		7.16 .30	85.1 +0.3		56.02 .10	54.5 0.3	
18.2	28.94 .65	82.8 1.4		28.51 .08	42.5 0.5		6.86 .29	84.6 0.7		55.92 .09	54.9 0.4	
28.2	28.32 .57	81.1 1.9		28.44 .07	42.9 0.4		6.58 .27	83.6 1.2		55.84 .08	55.3 0.4	
July 8.1	27.80 .47	79.0 2.3		28.38 .05	43.2 0.3		6.32 .24	82.2 1.7		55.77 .06	55.6 0.3	
18.1	27.39- .36	76.5 -2.7		28.34 -.03	43.4 +0.2		6.09 -.21	80.3 +2.0		55.72 -.04	55.8 +0.1	
28.1	27.08 .25	73.6 3.0		28.32 -.01	43.6 +0.1		5.91 .16	78.1 2.3		55.69 -.02	55.9 0.0	
Aug. 7.1	26.89- .13	70.5 3.2		28.32 +.02	43.6 -0.1		5.77 .11	75.6 2.6		55.68 .00	55.8 -0.1	
17.0	26.82 .00	67.1 3.4		28.35 .04	43.5 0.2		5.69 -.05	72.9 2.7		55.69 +.03	55.6 0.3	
27.0	26.89+ .13	63.6 3.5		28.41 .07	43.2 0.4		5.67 +.02	70.2 2.8		55.73 .05	55.2 0.3	
Sept. 6.0	27.08+ .26	60.1 -3.6		28.49 +.10	42.7 -0.6		5.72 +.09	67.4 +2.7		55.80 +.08	54.7 -0.7	
16.0	27.40 .39	56.5 3.6		28.61 .13	42.0 0.8		5.85 .16	64.7 2.6		55.90 .12	53.9 0.9	
25.9	27.85 .51	53.0 3.5		28.75 .17	41.1 1.0		6.04 .23	62.2 2.3		56.03 .15	52.9 1.1	
Oct. 5.9	28.43 .63	49.6 3.3		28.94 .20	39.9 1.2		6.31 .30	60.1 1.9		56.20 .18	51.7 1.3	
15.9	29.12 .75	46.4 3.0		29.16 .23	38.6 1.4		6.65 .37	58.4 1.5		56.40 .22	50.2 1.5	
25.8	29.93+ .85	43.6 -2.7		29.41 +.26	37.0 -1.7		7.06 +.43	57.2 +0.9		56.64 +.25	48.6 -1.7	
Nov. 4.8	30.83 .94	41.0 2.3		29.69 .29	35.2 1.8		7.51 .48	56.5 +0.3		56.91 .28	46.8 1.9	
14.8	31.81 1.01	39.0 1.8		29.99 .31	33.3 2.0		8.01 .51	56.5 -0.3		57.21 .31	44.8 2.0	
24.7	32.84 1.05	37.4 1.3		30.31 .33	31.3 2.0		8.54 .53	57.1 0.9		57.53 .33	42.7 2.1	
Dec. 4.7	33.91 1.07	36.3 0.7		30.65 .33	29.3 2.0		9.08 .53	58.3 1.5		57.86 .34	40.6 2.1	
14.7	34.97+1.05	35.9 -0.2		30.98 +.33	27.3 -2.0		9.61 +.52	60.2 -2.1		58.20 +.33	38.6 -2.0	
24.7	36.01 1.00	36.0 +0.4		31.31 .32	25.4 1.9		10.11 .49	62.5 2.6		58.53 .32	36.6 1.9	
34.6	36.98+ .93	36.7 +0.9		31.61 +.30	23.6 -1.7		10.58 +.45	65.4 -3.0		58.85 +.31	34.8 -1.7	

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Ursæ Majoris.		$\delta$ Leonis.		$\delta$ Crateris.		$\epsilon$ Leonis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	h m 10 57	° ' " +62 17	h m 11 8	° ' " +21 4	h m 11 14	° ' " -14 13	h m 11 22	° ' " + 3 24
(Dec. 30.7)	28.95 +.57	44.1 -0.1	42.71 +.34	43.6 -1.6	15.83 +.32	38.3 -2.5	42.90 +.32	56.5 -2.2
Jan. 9.7	29.50 -.52	44.3 +0.5	43.04 -.31	42.1 1.5	16.14 .30	40.8 .25	43.22 .30	54.4 .20
19.6	29.99 -.46	45.0 1.0	43.34 .28	41.0 0.9	16.43 .27	43.2 .24	43.51 .27	52.6 1.7
29.6	30.42 -.38	46.3 1.5	43.60 .24	40.3 0.6	16.68 .23	45.6 .23	43.76 .23	50.9 1.5
Feb. 8.6	30.76 -.30	48.1 1.9	43.81 .19	39.9 -0.2	16.88 .18	47.8 .22	43.98 .19	49.6 1.2
18.5	31.01 +.20	50.2 +2.3	43.98 +.14	39.8 +0.1	17.04 +.14	49.9 -2.0	44.15 +.15	48.5 -1.0
28.5	31.17 .11	52.6 .25	44.10 .09	40.1 0.4	17.16 .09	51.8 1.7	44.27 .20	47.6 0.7
Mar. 10.5	31.23 +.01	55.1 .26	44.17 .05	40.6 0.6	17.23 .05	53.4 1.5	44.35 .06	47.1 0.4
20.5	31.20 -.07	57.8 .26	44.19 +.01	41.4 0.8	17.26 +.01	54.8 1.2	44.40 +.02	46.8 -0.2
30.4	31.08 .15	60.3 .25	44.18 -.03	42.3 1.0	17.25 -.02	55.9 1.0	44.40 -.02	46.7 .00
Apr. 9.4	30.89 -.22	62.7 +2.3	44.13 -.06	43.3 +1.0	17.21 -.05	56.7 -0.7	44.37 -.04	46.8 +0.2
19.4	30.64 .27	64.8 .20	44.05 .09	44.4 1.0	17.15 .07	57.3 0.5	44.32 .06	47.1 0.3
29.4	30.34 .31	66.6 1.6	43.95 .10	45.4 1.0	17.07 .09	57.7 0.3	44.25 .08	47.5 0.4
May 9.3	30.02 .34	68.0 1.2	43.85 .11	46.3 0.9	16.98 .10	57.8 -0.1	44.16 .09	47.9 0.5
19.3	29.67 .35	69.0 0.7	43.73 .12	47.2 0.8	16.87 .10	57.8 +0.2	44.06 .10	48.5 0.6
29.3	29.32 -.35	69.4 +0.2	43.61 -.12	48.0 +0.7	16.77 -.11	57.5 +0.4	43.96 -.10	49.1 +0.6
June 8.2	28.98 .33	69.4 -0.2	43.49 .11	48.6 0.5	16.66 .11	57.1 0.5	43.86 .10	49.7 0.6
18.2	28.66 .31	69.0 0.7	43.38 .10	49.0 0.3	16.56 .10	56.5 0.7	43.76 .10	50.3 0.6
28.2	28.36 .28	68.0 1.2	43.28 .10	49.2 +0.1	16.46 .09	55.7 0.8	43.67 .09	50.8 0.6
July 8.2	28.10 .24	66.6 1.6	43.20 .08	49.2 -0.1	16.37 .08	54.8 1.0	43.59 .08	51.4 0.5
18.1	27.88 -.20	64.8 -2.0	43.12 -.06	49.1 -0.2	16.29 -.07	53.8 +2.0	43.52 -.06	51.9 +0.5
28.1	27.71 .15	62.6 .25	43.07 .04	48.7 0.4	16.23 .05	52.7 1.1	43.46 .05	52.3 0.4
Aug. 7.1	27.59 -.09	60.1 .26	43.03 -.02	48.2 0.7	16.18 .03	51.6 1.1	43.42 .03	52.6 0.3
17.1	27.52 -.04	57.3 .29	43.02 .00	47.4 0.9	16.16 -.01	50.5 1.0	43.40 -.01	52.8 +0.1
27.0	27.51 +.02	54.3 3.1	43.03 +.05	46.4 1.1	16.16 +.02	49.5 0.9	43.40 +.01	52.8 0.0
Sept. 6.0	27.57 +.09	51.1 -3.3	43.08 +.06	45.2 -1.3	16.20 +.05	48.6 +0.8	43.42 +.04	52.7 -0.2
16.0	27.69 .15	47.8 3.4	43.15 .09	43.8 1.5	16.26 .08	47.9 0.6	43.48 .07	52.4 0.4
25.9	27.88 .22	44.4 3.4	43.26 .13	42.2 1.7	16.36 .12	47.5 +0.3	43.57 .11	51.8 0.7
Oct. 5.9	28.13 .22	41.1 3.3	43.41 .17	40.5 1.9	16.51 .16	47.2 0.0	43.70 .15	51.0 0.9
15.9	28.46 .36	37.8 3.2	43.60 .21	38.5 2.0	16.69 .20	47.4 -0.3	43.87 .19	49.9 1.2
25.9	28.85 +.42	34.7 -3.0	43.82 +.24	36.4 -2.2	16.91 +.24	47.8 -0.6	44.08 +.22	48.6 -1.5
Nov. 4.8	29.30 .48	31.8 .27	44.09 .28	34.2 .28	17.16 .27	48.7 1.0	44.32 .26	47.0 1.7
14.8	29.81 .53	29.2 .24	44.38 .31	31.9 2.3	17.45 .30	49.9 1.4	44.60 .29	45.2 1.9
24.8	30.35 .56	27.0 2.0	44.70 .33	29.6 2.2	17.77 .32	51.4 1.7	44.90 .31	43.2 2.0
Dec. 4.8	30.93 .59	25.2 1.5	45.04 .35	27.5 2.1	18.10 .34	53.3 2.0	45.22 .33	41.1 2.1
14.7	31.53 +.59	24.0 -1.0	45.39 +.35	25.4 -2.0	18.44 +.34	55.4 -2.2	45.56 +.33	38.9 -2.2
24.7	32.12 .58	23.3 -0.4	45.74 .34	23.5 1.7	18.78 .33	57.7 .25	45.89 .33	36.7 2.1
34.7	32.69 +.56	23.2 +0.2	46.08 +.33	21.9 -1.4	19.11 +.32	60.1 -2.4	46.22 +.32	34.6 -2.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\lambda$ Draconia.		$\nu$ Leonia.		$\beta$ Leonia.		$\gamma$ Ursæ Majoris.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 11 25	° ' " +69 52	h m 11 31	° ' " - 0 15	h m 11 43	° ' " +15 7	h m 11 48	° ' " +54 14
(Dec. 30.7)	23.95 +.75	74.2 -0.2	44.90 +.32	45.5 -2.1	52.79 +.34	79.4 -1.9	29.92 +.49	79.2 -0.9
Jan. 9.7	24.68 .70	74.3 +0.4	45.22 .31	47.6 2.1	53.12 .32	77.6 1.6	30.40 .47	78.6 -0.4
19.7	25.35 .63	75.0 1.0	45.52 .28	49.6 1.9	53.43 .29	76.1 1.3	30.86 .43	78.5 +0.2
29.6	25.94 .54	76.3 1.6	45.78 .24	51.4 1.7	53.70 .26	74.9 1.0	31.26 .38	79.0 0.8
Feb. 8.6	26.44 .44	78.1 2.0	46.00 .20	53.0 1.5	53.94 .22	74.1 0.6	31.62 .32	80.0 1.3
18.6	26.82 +.32	80.4 +2.4	46.17 +.16	54.3 -1.2	54.14 +.17	73.7 -0.3	31.90 +.25	81.5 +1.7
28.5	27.08 .20	82.9 2.7	46.31 .11	55.4 0.9	54.29 .13	73.5 0.0	32.12 .18	83.4 2.0
Mar. 10.5	27.21 +.07	85.7 2.8	46.40 .07	56.2 0.7	54.39 .08	73.6 +0.3	32.26 .10	85.6 2.3
20.5	27.22 -.05	88.6 2.8	46.45 +.03	56.7 0.4	54.45 .04	74.1 0.5	32.33 +.03	88.0 2.4
30.5	27.11 .16	91.4 2.8	46.46 .00	57.0 -0.2	54.47 +.01	74.7 0.7	32.32 -.03	90.5 2.5
Apr. 9.4	26.90 -.26	94.1 +2.6	46.44 -.03	57.1 0.0	54.46 -.03	75.5 +0.8	32.26 -.09	92.9 +2.4
19.4	26.59 .35	96.5 2.3	46.40 .05	57.0 +0.1	54.42 .05	76.4 0.9	32.14 .14	95.3 2.3
29.4	26.20 .41	98.6 1.9	46.33 .07	56.8 0.3	54.35 .07	77.3 0.9	31.97 .18	97.5 2.0
May 9.3	25.76 .46	100.3 1.5	46.25 .09	56.4 0.4	54.27 .09	78.2 0.9	31.77 .21	99.4 1.7
19.3	25.28 .49	101.5 1.0	46.16 .09	56.0 0.5	54.17 .10	79.1 0.9	31.55 .24	100.9 1.3
29.3	24.77 -.50	102.3 +0.5	46.06 -.10	55.5 +0.5	54.07 -.11	80.0 +0.8	31.30 -.25	102.0 +0.9
June 8.3	24.27 .30	102.5 0.0	45.97 .10	54.9 0.6	53.96 .11	80.7 0.7	31.05 .25	102.8 0.5
18.2	23.77 .48	102.2 -0.6	45.87 .10	54.3 0.6	53.86 .10	81.3 0.5	30.80 .25	103.0 +0.1
28.2	23.30 .45	101.4 1.1	45.78 .09	53.6 0.6	53.75 .10	81.8 0.4	30.55 .24	102.9 -0.4
July 8.2	22.86 .41	100.0 1.6	45.69 .08	53.0 0.6	53.65 .09	82.1 0.2	30.32 .22	102.2 0.8
18.2	22.48 -.36	98.2 -2.0	45.61 -.07	52.4 +0.6	53.57 -.08	82.3 +0.1	30.11 -.20	101.2 -1.3
28.1	22.14 .30	96.0 2.4	45.55 .06	51.9 0.5	53.49 .07	82.2 -0.1	29.92 .17	99.7 1.7
Aug. 7.1	21.87 .23	93.4 2.8	45.50 .04	51.4 0.4	53.43 .05	82.0 0.3	29.77 .14	97.8 2.0
17.1	21.68 .16	90.5 3.1	45.47 -.02	51.0 0.5	53.38 .05	81.6 0.5	29.65 .10	95.6 2.4
27.0	21.56 -.08	87.3 3.3	45.46 +.02	50.8 +0.2	53.36 -.01	81.0 0.7	29.56 .06	93.1 2.7
Sept. 6.0	21.53 +.02	83.9 -3.5	45.48 +.03	50.7 0.0	53.37 +.02	80.2 -0.9	29.53 -.01	90.3 -2.9
16.0	21.58 .10	80.4 3.6	45.53 .07	50.9 -0.2	53.40 .05	79.2 1.2	29.54 +.04	87.2 3.1
26.0	21.72 .19	76.7 3.6	45.61 .10	51.2 0.5	53.47 .09	77.9 1.4	29.61 .09	84.0 3.3
Oct. 5.9	21.96 .29	73.1 3.6	45.73 .14	51.8 0.7	53.58 .13	76.4 1.6	29.73 .15	80.7 3.3
15.9	22.30 .38	69.5 3.5	45.89 .18	52.7 1.0	53.73 .17	74.7 1.8	29.92 .21	77.4 3.3
25.9	22.72 +.47	66.1 -3.3	46.09 +.22	53.9 -1.3	53.92 +.21	72.7 -2.0	30.16 +.28	74.0 -3.3
Nov. 4.9	23.24 .53	62.9 3.0	46.33 .25	55.3 1.5	54.15 .25	70.7 2.2	30.47 .33	70.8 3.1
14.8	23.83 .63	60.1 2.6	46.60 .29	56.9 1.8	54.41 .28	68.5 2.3	30.83 .38	67.7 2.9
24.8	24.49 .69	57.6 2.2	46.90 .31	58.8 2.0	54.71 .31	66.2 2.3	31.23 .43	64.9 2.6
Dec. 4.8	25.21 .73	55.6 1.7	47.22 .31	60.9 2.1	55.03 .33	63.9 2.3	31.68 .46	62.5 2.2
14.7	25.96 +.75	54.2 -1.2	47.55 +.33	63.0 -2.2	55.37 +.34	61.6 -2.2	32.16 +.48	60.5 -1.8
24.7	26.71 .75	53.3 -0.6	47.89 .33	65.2 2.2	55.71 .34	59.5 2.0	32.65 .49	58.9 1.3
34.7	27.46 +.74	53.1 0.0	48.21 +.32	67.4 -2.1	56.04 +.34	57.6 -1.8	33.13 +.49	58.0 -0.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Virginis		γ Draconis (H.)		γ Corvi.		β Chamæleontis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 12 0	° ' " + 9 17	h m 12 7	° ' " + 78 10	h m 12 10	° ' " - 16 58	h m 12 12	° ' " - 78 44
(Dec. 30.7)	2.01 +.34	47.2 -2.1	28.80+1.17	32.4 -0.5	34.65 +.35	34.1 -2.3	22.08+1.26	31.2 -1.5
Jan. 9.7	2.34 .32	45.2 1.8	29.96 1.14	32.2 +0.1	34.99 .33	36.4 2.3	23.31 1.19	32.9 2.0
19.7	2.66 .30	43.5 1.6	31.08 1.07	32.6 0.8	35.31 .31	38.8 2.3	24.45 1.09	35.2 2.6
29.6	2.94 .26	42.0 1.3	32.11 .96	33.7 1.4	35.60 .27	41.1 2.3	25.48 .96	38.0 3.0
Feb. 8.6	3.18 .23	40.9 1.0	33.01 .82	35.4 1.9	35.86 .24	43.4 2.2	26.38 .82	41.2 3.3
18.6	3.39 +.18	40.0 -0.7	33.75+ .65	37.6 +2.4	36.08 +.20	45.5 -2.0	27.12+ .66	44.7 -3.6
28.6	3.55 .24	39.5 0.4	34.32 .46	40.1 2.7	36.25 .15	47.5 1.9	27.70 .49	48.4 3.8
Mar. 10.5	3.67 .10	39.3 -0.1	34.68 .26	43.0 2.9	36.38 .11	49.2 1.6	28.10 .32	52.2 3.8
20.5	3.75 .06	39.4 +0.2	34.84+ .06	46.0 3.0	36.47 .07	50.8 1.4	28.33+ .15	56.1 3.8
30.5	3.79 +.02	39.7 0.4	34.80- .14	49.0 3.0	36.53 +.04	52.1 1.2	28.40- .02	59.9 3.7
Apr. 9.5	3.79 -.01	40.1 +0.6	34.56- .32	52.0 +2.9	36.55 .00	53.1 -0.9	28.30- .18	63.6 -3.6
19.4	3.77 .04	40.8 0.7	34.15 .49	54.8 2.6	36.54 -.02	54.0 0.7	28.04 .32	67.1 3.3
29.4	3.72 .06	41.5 0.8	33.58 .63	57.3 2.3	36.50 .04	54.5 0.5	27.05 .46	70.3 3.0
May 9.4	3.65 .07	42.3 0.8	32.88 .75	59.4 1.9	36.45 .06	54.9 0.3	27.12 .39	73.2 2.7
19.3	3.57 .09	43.1 0.8	32.08 .84	61.1 1.4	36.38 .08	55.1 -0.1	26.48 .69	75.6 2.3
29.3	3.48 -.09	43.9 +0.8	31.21- .90	62.2 +0.9	36.29 -.09	55.0 +0.1	25.73- .78	77.7 -1.8
June 8.3	3.38 .10	44.6 0.7	30.29 .93	62.8 +0.3	36.20 .10	54.8 0.3	24.91 .85	79.2 1.3
18.3	3.28 .10	45.3 0.6	29.35 .93	62.9 -0.2	36.10 .10	54.4 0.5	24.03 .90	80.3 0.8
28.2	3.18 .10	45.8 0.5	28.42 .91	62.4 0.8	36.00 .10	53.8 0.6	23.11 .92	80.7 -0.2
July 8.2	3.09 .09	46.3 0.4	27.53 .87	61.4 1.3	35.89 .10	53.1 0.8	22.19 .92	80.6 +0.4
18.2	3.00 -.09	46.7 +0.3	26.68- .81	59.8 -1.8	35.79 -.10	52.3 +0.9	21.28- .88	80.0 +0.9
28.1	2.91 .08	46.9 +0.2	25.91 .73	57.8 2.2	35.70 .09	51.4 1.0	20.42 .82	78.9 1.4
Aug. 7.1	2.84 .06	47.0 0.0	25.23 .63	55.4 2.7	35.61 .08	50.3 1.0	19.63 .73	77.2 1.9
17.1	2.79 .04	46.9 -0.2	24.66 .52	52.5 3.0	35.54 .06	49.3 1.0	18.96 .61	75.1 2.3
27.1	2.76 -.02	46.6 0.4	24.20 .39	49.3 3.3	35.49 .04	48.3 1.0	18.41 .46	72.6 2.6
Sept. 6.0	2.75 +.01	46.2 -0.6	23.88- .25	45.9 -3.5	35.47 -.01	47.3 +0.9	18.03- .89	69.9 +2.8
16.0	2.77 .04	45.5 0.8	23.70- .10	42.2 3.7	35.48 +.03	46.5 0.7	17.84- .10	67.0 3.0
26.0	2.82 .07	44.5 1.0	23.67+ .05	38.4 3.8	35.52 .07	45.8 0.5	17.84+ .11	63.9 3.0
Oct. 6.0	2.91 .11	43.4 1.3	23.80 .21	34.6 3.8	35.61 .11	45.4 +0.3	18.05 .32	61.0 2.9
15.9	3.04 .15	42.0 1.5	24.10 .38	30.8 3.8	35.74 .15	45.3 0.0	18.48 .33	58.1 2.7
25.9	3.22 +.19	40.4 -1.7	24.56+ .54	27.1 -3.6	35.91 +.20	45.4 -0.3	19.10+ .72	55.6 +2.4
Nov. 4.9	3.43 .23	38.5 1.9	25.17 .69	23.6 3.3	36.13 .24	46.0 0.7	19.92 .90	53.4 1.9
14.8	3.68 .27	36.5 2.1	25.94 .84	20.4 3.0	36.39 .28	46.8 1.0	20.90 1.05	51.7 1.4
24.8	3.96 .30	34.3 2.2	26.84 .96	17.6 2.6	36.68 .31	48.0 1.4	22.02 1.17	50.6 0.8
Dec. 4.8	4.28 .32	32.1 2.2	27.86 1.06	15.2 2.1	37.00 .33	49.6 1.7	23.24 1.24	50.1 +0.2
14.8	4.61 +.33	29.9 -2.2	28.96+1.13	13.4 -1.5	37.34 +.34	51.4 -1.9	24.51+1.28	50.2 -0.4
24.7	4.94 .34	27.7 2.1	30.12 1.16	12.2 0.9	37.69 .35	53.4 2.1	25.80 1.28	50.9 1.1
34.7	5.28 +.33	25.6 -2.0	31.29+1.16	11.6 -0.2	38.04 +.34	55.6 -2.3	27.06+1.23	52.3 -1.7



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\eta$ Virginia.		$\alpha^1$ Crucis.		$\beta$ Corvi.		$\epsilon$ Draconis.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<div>h m</div> <div>12 14</div>	<div>° '</div> <div>— 0 6</div>	<div>h m</div> <div>12 20</div>	<div>° '</div> <div>— 62 31</div>	<div>h m</div> <div>12 29</div>	<div>° '</div> <div>— 22 49</div>	<div>h m</div> <div>12 29</div>	<div>° '</div> <div>+ 70 20</div>
	<div>h m</div>	<div>° '</div>	<div>h m</div>	<div>° '</div>	<div>h m</div>	<div>° '</div>	<div>h m</div>	<div>° '</div>
(Dec. 30-7)	42.33 +.33	8.0 — 2.2	56.15 +.61	50.9 — 1.7	2.60 +.36	58.0 — 2.1	9.60 +.75	35.0 — 1.0
Jan. 9-7	42.66 .32	10.2 2.1	56.74 .58	52.9 2.2	2.96 .35	60.2 2.3	10.35 .74	34.3 — 0.4
19-7	42.98 .30	12.2 1.9	57.30 .53	55.3 2.6	3.30 .32	62.6 2.4	11.08 .71	34.3 +.3
29-6	43.27 .27	14.0 1.7	57.81 .48	58.1 3.0	3.61 .29	65.0 2.4	11.77 .65	34.9 0.9
Feb. 8-6	43.52 .23	15.6 1.5	58.26 .41	61.2 3.3	3.88 .26	67.4 2.3	12.39 .57	36.1 1.5
	18.6	43.74 +.19	17.0 — 1.2	58.63 +.34	64.6 — 3.4	4.12 +.22	69.7 — 2.3	12.91 +.47
	28.6	43.91 .15	18.0 0.9	58.94 .27	68.1 3.5	4.32 .18	71.9 2.1	13.33 .36
Mar. 10-5	44.04 .11	18.8 0.6	59.16 .19	71.7 3.6	4.47 .14	73.9 1.9	13.64 .24	42.6 2.7
20-5	44.14 .07	19.3 0.4	59.32 .12	75.2 3.5	4.59 .10	75.8 1.7	13.81 +.12	45.5 2.9
30-5	44.19 .04	19.6 — 0.2	59.40 +.05	78.7 3.4	4.67 .06	77.4 1.5	13.87 .00	48.4 3.0
Apr. 9-5	44.21 +.01	19.6 0.0	59.41 —.02	82.0 — 3.2	4.71 +.03	78.8 — 1.3	13.81 —.11	51.4 +2.9
19-4	44.21 —.01	19.5 +.0.2	59.36 .08	85.0 2.9	4.72 .00	79.9 1.0	13.64 .22	54.3 2.8
29-4	44.18 .04	19.2 0.3	59.25 .13	87.8 2.6	4.70 —.03	80.9 0.8	13.38 .31	56.9 2.5
May 9-4	44.12 .06	18.8 0.4	59.09 .18	90.2 2.2	4.66 .05	81.6 0.6	13.02 .38	59.3 2.1
19-3	44.06 .07	18.3 0.5	58.88 .23	92.3 1.8	4.60 .07	82.0 0.3	12.61 .44	61.2 1.7
	29-3	43.98 —.08	17.7 +.0.6	58.64 —.26	93.9 — 1.4	4.52 —.08	82.2 — 0.1	12.14 —.49
June 8-3	43.89 .09	17.1 0.6	58.36 .29	95.1 0.9	4.43 .10	82.2 +.0.1	11.63 .52	63.8 0.8
18-3	43.80 .09	16.5 0.6	58.05 .31	95.8 — 0.5	4.33 .11	82.0 0.3	11.10 .53	64.3 +.0.2
28-2	43.70 .10	15.9 0.6	57.73 .33	96.0 0.0	4.22 .11	81.6 0.5	10.57 .53	64.3 — 0.3
July 8-2	43.61 .10	15.2 0.6	57.40 .33	95.8 +.0.5	4.11 .11	81.0 0.7	10.05 .51	63.7 0.8
	18-2	43.51 —.09	14.7 +.0.5	57.08 —.32	95.0 +1.0	3.99 —.11	80.2 +.0.9	9.54 —.49
	28-2	43.42 .08	14.1 0.5	56.76 .30	93.8 1.4	3.88 .11	79.2 1.0	9.07 .45
Aug. 7-1	43.35 .07	13.7 0.4	56.48 .27	92.1 1.8	3.78 .09	78.1 1.1	8.64 .40	59.1 2.2
17-1	43.28 .05	13.4 0.3	56.23 .22	90.1 2.2	3.69 .08	76.9 1.2	8.27 .34	56.6 2.6
27-1	43.24 .03	13.2 +.0.1	56.02 .17	87.8 2.4	3.62 .06	75.7 1.2	7.96 .27	53.8 3.0
Sept. 6-0	43.22 —.01	13.1 0.0	55.89 —.10	85.3 +2.6	3.58 —.03	74.5 +1.2	7.72 —.20	50.6 — 3.3
16-0	43.22 +.02	13.2 — 0.2	55.82 —.02	82.6 2.7	3.57 +.01	73.4 1.1	7.56 .11	47.2 3.5
26-0	43.26 .06	13.6 0.5	55.84 +.06	79.9 2.7	3.60 .05	72.4 0.9	7.50 —.02	43.6 3.7
Oct. 6-0	43.34 .10	14.2 0.7	55.95 .15	77.3 2.5	3.66 .09	71.6 0.7	7.53 +.08	39.9 3.8
15-9	43.46 .14	15.0 1.0	56.14 .24	74.8 2.3	3.78 .14	71.1 +.0.4	7.67 .19	36.1 3.8
	25-9	43.62 +.18	16.1 — 1.2	56.43 +.33	72.7 +1.9	3.94 +.19	70.9 0.0	7.91 +.29
Nov. 4-9	43.82 .22	17.5 1.5	56.81 .41	71.0 1.5	4.15 .23	71.0 — 0.3	8.25 .39	28.7 3.5
14-9	44.07 .26	19.1 1.7	57.26 .48	69.8 1.0	4.40 .27	71.5 0.7	8.70 .49	25.3 3.3
24-8	44.34 .29	21.0 1.9	57.78 .54	69.0 +.0.4	4.70 .31	72.4 1.0	9.24 .58	22.2 2.9
Dec. 4-8	44.65 .32	23.0 2.1	58.34 .58	68.9 — 0.2	5.02 .34	73.6 1.4	9.86 .65	19.4 2.5
	14-8	44.98 +.33	25.1 — 2.2	58.94 +.60	69.4 — 0.8	5.37 +.35	75.2 — 1.7	10.54 +.71
	24-7	45.31 .33	27.3 2.2	59.55 .61	70.4 1.3	5.72 .36	77.0 2.0	11.27 .74
	34-7	45.64 +.32	29.4 — 2.2	60.16 +.59	72.1 — 1.9	6.08 +.35	79.1 — 2.2	12.02 +.75

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	32 <sup>o</sup> Camelop. (H.)		α Can. Venaticorum.		θ Virginis.		α Virginis. (Spica.)		
	Right Ascension.	Declination North	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	
	h m 12 48	° +83 57	h m 12 51	° +38 51	h m 13 4	° - 4 59	h m 13 19	° -10 37	
	s	"	s	"	s	"	s	"	
(Dec. 30.7)	24.55+2.13	34.7 -0.9	16.44 +.41	48.1 -1.9	40.84 +.34	47.0 -2.1	49.78 +.34	49.3 -2.0	
Jan. 9.7	26.69 2.14	34.1 -0.3	16.84 .39	46.4 1.4	41.18 .33	49.1 2.1	50.12 .34	51.4 2.0	
19.7	28.82 2.08	34.2 +0.4	17.22 .37	45.2 0.9	41.50 .32	51.2 2.0	50.46 .33	53.4 2.0	
29.7	30.85 1.95	34.9 1.0	17.58 .35	44.6 -0.4	41.82 .30	53.1 1.8	50.78 .31	55.4 1.9	
Feb. 8.6	32.71 1.74	36.2 1.6	17.91 .31	44.5 +0.1	42.10 .27	54.8 1.6	51.08 .28	57.3 1.8	
	18.6	34.33+1.47	38.1 +2.1	18.20 +.27	44.9 +0.6	42.36 +.24	56.4 -1.4	51.34 +.23	59.0 -1.6
	28.6	35.65 1.14	40.4 2.5	18.45 .22	45.8 1.1	42.58 .20	57.7 1.2	51.58 .22	60.5 1.4
Mar. 10.6	36.62 .78	43.2 2.9	18.64 .17	47.1 1.5	42.76 .16	58.7 0.9	51.77 .18	61.8 1.2	
20.5	37.22 .40	46.2 3.0	18.78 .12	48.7 1.8	42.90 .13	59.5 0.7	51.93 .14	62.8 0.9	
30.5	37.43+ .02	49.2 3.1	18.87 .07	50.6 2.0	43.01 .09	60.0 0.4	52.06 .11	63.7 0.7	
Apr. 9.5	37.25- .36	52.4 +3.0	18.92 +.02	52.7 +2.1	43.08 +.06	60.3 -0.2	52.15 +.08	64.3 -0.5	
19.4	36.70 .72	55.4 2.9	18.91 -0.2	54.9 2.2	43.13 +.03	60.4 0.0	52.21 .05	64.7 0.3	
29.4	35.81 1.05	58.1 2.6	18.88 .06	57.1 2.2	43.14 .00	60.3 +0.2	52.25 +.02	65.0 -2.1	
May 9.4	34.61 1.33	60.6 2.2	18.80 .09	59.1 2.0	43.14 -0.2	60.1 0.3	52.25 .00	65.0 0.0	
19.4	33.15 1.56	62.6 1.8	18.70 .11	61.0 1.8	43.11 .04	59.7 0.4	52.24 -0.3	64.9 +0.1	
	29.3	31.48-1.74	64.2 +1.3	18.58 -0.13	62.7 +1.5	43.06 -0.06	59.3 +0.5	52.20 -0.05	64.7 +0.3
June 8.3	29.66 1.87	65.2 0.8	18.43 .15	64.1 1.2	42.99 .07	58.8 0.5	52.14 .06	64.4 0.4	
18.3	27.74 1.95	65.8 +0.2	18.28 .16	65.1 0.9	42.92 .09	58.2 0.6	52.07 .08	64.0 0.5	
28.3	25.77 1.97	65.7 -0.3	18.12 .17	65.8 0.5	42.82 .10	57.6 0.6	51.98 .09	63.5 0.5	
July 8.2	23.80 1.94	65.1 0.9	17.95 .17	66.2 +0.1	42.72 .10	57.0 0.6	51.89 .10	62.9 0.6	
	18.2	21.88-1.87	64.0 -1.4	17.78 -0.17	66.1 -0.2	42.62 -0.11	56.4 +0.6	51.78 -0.11	62.3 +0.6
	28.2	20.06 1.76	62.3 1.9	17.62 .16	65.7 0.6	42.51 .12	55.8 0.6	51.67 .11	61.7 0.7
Aug. 7.1	18.37 1.61	60.2 2.4	17.46 .15	64.9 1.0	42.41 .10	55.2 0.5	51.56 .11	61.0 0.7	
17.1	16.85 1.42	57.6 2.8	17.33 .13	63.7 1.4	42.32 .09	54.7 0.5	51.45 .10	60.4 0.6	
27.1	15.53 1.20	54.6 3.1	17.21 .10	62.1 1.7	42.23 .07	54.3 0.4	51.36 .09	59.7 0.6	
Sept. 6.1	14.44- .96	51.4 -3.4	17.12 -0.08	60.3 -2.0	42.17 -0.05	54.0 +0.2	51.28 -0.07	59.2 +0.5	
16.0	13.62 .68	47.8 3.6	17.06 -0.04	58.1 2.3	42.13 -0.02	53.9 0.0	51.22 -0.04	58.8 0.4	
26.0	13.08 .39	44.1 3.8	17.04 .00	55.6 2.6	42.12 +0.01	53.9 -0.1	51.20 .00	58.5 +0.2	
Oct. 6.0	12.83- .08	40.2 3.9	17.06 +0.05	52.9 2.8	42.15 .05	54.2 0.4	51.22 +0.04	58.4 0.0	
16.0	12.91+ .24	36.4 3.9	17.13 .10	50.0 3.0	42.22 .09	54.6 0.6	51.27 .08	58.5 -0.2	
	25.9	13.31+ .56	32.5 -3.8	17.25 +.15	47.0 -3.1	42.33 +.14	55.4 -0.9	51.38 +.13	58.9 -0.5
Nov. 4.9	14.04 .88	28.8 3.6	17.43 .20	43.9 3.1	42.49 .18	56.4 1.2	51.52 .17	59.5 0.8	
14.9	15.08 1.19	25.4 3.3	17.66 .25	40.7 3.1	42.70 .22	57.7 1.4	51.72 .22	60.5 1.1	
24.8	16.42 1.48	22.3 2.9	17.93 .30	37.7 3.0	42.94 .26	59.2 1.6	51.96 .26	61.7 1.3	
Dec. 4.8	18.03 1.72	19.6 2.5	18.25 .34	34.7 2.8	43.23 .30	61.0 1.8	52.24 .29	63.2 1.6	
	14.8	19.87+1.92	17.3 -1.9	18.60 +.36	32.1 -2.5	43.54 +.32	62.9 2.0	52.55 +.32	64.9 -1.8
	24.8	21.88 2.06	15.7 1.3	18.98 .38	29.7 2.1	43.86 .33	65.0 2.1	52.88 .34	66.7 1.9
	34.7	23.98+2.12	14.7 -0.7	19.36 +.39	27.8 -1.7	44.20 +.34	67.0 -2.1	53.21 +.34	68.7 -2.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Virginis.		η Ursæ Majoris.		η Bootis.		β Centauri.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 13 29	° ' " — 0 4	h m 13 43	° ' " +49 48	h m 13 49	° ' " +18 53	h m 13 56	° ' " —59 52
(Dec. 30.8)	s	"	s	"	s	"	s	"
Jan. 9.8	30.35 +.33	36.6 —2.1	31.79 +.42	56.8 —2.2	50.21 +.33	77.4 —2.3	37.10 +.58	43.3 —0.4
19.7	30.68 .33	38.7 2.0	32.22 .43	54.8 1.7	50.55 .34	75.2 2.0	37.68 .59	44.0 1.0
29.7	31.01 .32	40.6 1.9	32.66 .43	53.3 1.1	50.88 .33	73.4 1.7	38.27 .58	45.3 1.4
Feb. 8.7	31.33 .31	42.4 1.7	33.08 .42	52.5 —0.5	51.22 .32	71.8 1.3	38.84 .56	46.9 1.8
18.7	31.63 .28	44.0 1.5	33.49 .39	52.3 +0.1	51.53 .30	70.7 0.9	39.39 .52	49.0 2.2
28.6	31.89 +.25	45.4 —1.2	33.87 +.35	52.7 +0.7	51.82 +.27	70.0 —0.5	39.89 +.48	51.3 —2.5
Mar. 10.6	32.13 .22	46.4 0.9	34.20 .31	53.6 1.2	52.08 .24	69.7 —0.1	40.35 .43	54.0 2.7
20.6	32.33 .18	47.2 0.6	34.48 .25	55.1 1.7	52.30 .20	69.8 +0.3	40.75 .38	56.8 2.9
30.5	32.50 .15	47.6 0.3	34.71 .20	57.0 2.1	52.48 .17	70.4 0.7	41.10 .32	59.7 3.0
Apr. 9.5	32.63 .11	47.8 —0.1	34.87 .14	59.3 2.4	52.63 .13	71.2 1.0	41.38 .25	62.7 3.0
19.5	32.73 +.08	47.8 +0.1	34.99 +.08	61.9 +2.6	52.75 +.10	72.4 +1.2	41.61 +.19	65.8 —3.0
29.5	32.79 .05	47.5 0.3	35.04 +.03	64.5 2.7	52.82 .06	73.7 1.4	41.77 .13	68.7 2.9
May 9.4	32.83 +.02	47.1 0.5	35.04 —.02	67.2 2.7	52.87 +.03	75.2 1.5	41.88 .07	71.5 2.8
19.4	32.84 .00	46.6 0.6	34.99 .07	69.9 2.6	52.89 .00	76.8 1.6	41.92 +.02	74.2 2.6
29.4	32.83 —.02	45.9 0.7	34.90 .11	72.4 2.4	52.88 —.02	78.4 1.5	41.91 —.04	76.6 2.3
June 8.3	32.79 —.04	45.3 +0.7	34.77 —.15	74.6 +2.1	52.84 —.05	79.9 +1.5	41.84 —.09	78.8 —2.0
18.3	32.74 .06	44.5 0.7	34.60 .18	76.6 1.8	52.78 .07	81.3 1.3	41.72 .14	80.7 1.7
28.3	32.67 .08	43.8 0.7	34.41 .20	78.2 1.4	52.70 .09	82.5 1.3	41.55 .19	82.2 1.3
July 8.3	32.59 .09	43.1 0.7	34.20 .22	79.4 1.0	52.60 .10	83.6 1.0	41.34 .23	83.3 0.9
18.2	32.49 .10	42.4 0.6	33.97 .24	80.1 0.5	52.49 .12	84.5 0.7	41.09 .26	84.0 —0.5
28.2	32.38 —.11	41.8 +0.6	33.73 —.24	80.4 +0.1	52.37 —.13	85.1 +0.5	40.81 —.29	84.3 0.0
Aug. 7.2	32.27 .11	41.3 0.5	33.48 .25	80.2 —0.4	52.24 .13	85.5 +0.2	40.51 .30	84.1 +0.4
17.2	32.16 .11	40.8 0.4	33.24 .24	79.6 0.9	52.10 .13	85.6 0.0	40.21 .30	83.5 0.8
27.1	32.05 .10	40.5 0.3	33.00 .23	78.5 1.3	51.97 .13	85.4 —0.3	39.90 .29	82.4 1.3
Sept. 6.1	31.95 .09	40.3 +0.1	32.78 .21	77.0 1.7	51.84 .12	85.0 0.6	39.62 .27	81.0 1.6
16.1	31.86 —.07	40.2 0.0	32.59 —.18	75.0 —2.1	51.73 —.10	84.3 —0.9	39.37 —.23	79.2 +2.0
26.0	31.80 .05	40.3 —0.2	32.42 .14	72.7 2.5	51.64 .08	83.3 1.1	39.16 .17	77.1 2.2
Oct. 6.0	31.77 —.02	40.6 0.4	32.30 .10	70.0 2.8	51.58 .05	82.0 1.4	39.02 .11	74.8 2.4
16.0	31.77 +.02	41.1 0.6	32.23 —.05	67.1 3.1	51.55 —.01	80.4 1.7	38.95 —.03	72.3 2.4
26.0	31.81 .07	41.9 0.9	32.21 +.01	63.8 3.3	51.56 +.03	78.6 2.0	38.96 +.06	69.9 2.4
Nov. 4.9	31.90 +.11	42.9 —1.1	32.25 +.07	60.4 —3.5	51.62 +.08	76.5 —2.2	39.06 +.15	67.5 +2.3
14.9	32.03 .16	44.1 1.4	32.36 .14	56.9 3.5	51.72 .13	74.2 2.4	39.25 .24	65.3 2.1
24.9	32.22 .20	45.6 1.6	32.53 .20	53.4 3.5	51.88 .18	71.8 2.5	39.53 .32	63.4 1.7
Dec. 4.8	32.44 .24	47.4 1.8	32.76 .26	49.9 3.4	52.08 .22	69.2 2.6	39.90 .40	61.8 1.3
14.8	32.70 .28	49.3 2.0	33.06 .32	46.6 3.2	52.32 .26	66.6 2.6	40.34 .47	60.7 0.9
24.8	33.00 +.31	51.3 —2.1	33.40 +.37	43.5 —2.9	52.60 +.30	63.9 —2.6	40.84 +.52	60.1 +0.4
34.8	33.31 .32	53.4 2.1	33.79 .40	40.8 2.5	52.91 .32	61.4 2.4	41.38 .56	60.0 —0.1
	33.64 +.33	55.5 —2.1	34.20 +.43	38.5 —2.0	53.24 +.33	59.1 —2.2	41.95 +.58	60.3 —0.6

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Draconis.		$\epsilon$ Bootia. (Arcturus.)		$\theta$ Bootia.		$\rho$ Bootia.		
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	
	h m 14 1	$^{\circ}$ ' +64 51	h m 14 11	$^{\circ}$ ' +19 42	h m 14 21	$^{\circ}$ ' +52 18	h m 14 27	$^{\circ}$ ' +30 48	
(Dec. 30.8)	37.55 +34	22.3 -2.3	0.91 +32	33.2 -2.4	43.47 +41	56.8 -2.5	26.32 +33	50.6 -2.6	
Jan. 9.8	38.12 .58	20.3 1.7	1.24 .33	30.8 2.2	43.90 .43	54.5 2.1	26.66 .35	48.2 2.2	
19.8	38.72 .60	18.9 1.0	1.57 .33	28.8 1.8	44.34 .44	52.7 1.5	27.01 .35	46.2 1.8	
29.7	39.31 .59	18.2 -0.4	1.91 .33	27.2 1.4	44.78 .44	51.5 0.9	27.36 .35	44.7 1.3	
Feb. 8.7	39.89 .56	18.2 +0.3	2.22 .31	25.0 1.0	45.22 .42	50.9 -0.2	27.71 .33	43.6 0.8	
	18.7	40.43 +51	18.8 +0.9	2.52 +2.8	25.1 -0.6	45.63 +39	51.0 +0.4	28.03 +31	43.1 -0.3
	28.7	40.92 .45	20.1 1.5	2.79 .25	24.8 -0.1	46.01 .35	51.7 1.0	28.33 .28	43.1 +0.3
Mar. 10.6	41.34 .38	21.9 2.0	3.03 .22	24.9 +0.3	46.34 .31	53.0 1.5	28.59 .25	43.6 0.8	
20.6	41.68 .30	24.1 2.5	3.23 .19	25.4 0.7	46.62 .25	54.8 2.0	28.82 .21	44.6 1.2	
30.6	41.93 .21	26.8 2.8	3.40 .15	26.2 1.0	46.85 .20	57.0 2.4	29.02 .17	46.0 1.6	
Apr. 9.5	42.10 +12	29.7 +3.0	3.53 +1.1	27.4 +1.3	47.02 +14	59.5 +2.6	29.17 +13	47.8 +1.9	
19.5	42.17 +03	32.7 3.0	3.63 .08	28.7 1.5	47.13 .08	62.3 2.8	29.28 .10	49.7 2.1	
29.5	42.16 -05	35.8 3.0	3.69 .05	30.3 1.6	47.18 +02	65.1 2.9	29.36 .06	51.9 2.2	
May 9.5	42.07 .13	38.8 2.9	3.72 +02	31.9 1.6	47.17 -03	68.0 2.8	29.40 +02	54.1 2.2	
19.4	41.90 .20	41.6 2.7	3.73 -01	33.5 1.6	47.12 .08	70.8 2.7	29.40 -01	56.3 2.2	
	29.4	41.67 -26	44.1 +2.3	3.70 -04	35.1 +1.5	47.02 -12	73.4 +2.4	29.38 -04	58.4 +2.1
June 8.4	41.37 .32	46.2 2.0	3.66 .06	36.6 1.4	46.87 .16	75.7 2.1	29.32 .07	60.4 1.9	
18.4	41.03 .36	48.0 1.5	3.58 .08	38.0 1.5	46.69 .20	77.6 1.8	29.24 .10	62.2 1.6	
28.3	40.65 .40	49.3 1.0	3.49 .10	39.1 1.1	46.47 .23	79.2 1.4	29.13 .12	63.7 1.4	
July 8.3	40.24 .42	50.1 +0.5	3.38 .12	40.0 0.8	46.23 .25	80.4 0.9	29.00 .14	64.9 1.1	
	18.3	39.81 -43	50.3 0.0	3.26 -13	40.8 +0.6	45.97 -27	81.1 +0.5	28.85 -16	65.8 +0.7
	28.2	39.37 .44	50.1 -0.5	3.12 .14	41.2 +0.3	45.69 .28	81.3 0.0	28.69 .17	66.4 +0.4
Aug. 7.2	38.94 .43	49.3 1.0	2.98 .14	41.4 0.0	45.40 .28	81.1 -0.5	28.52 .17	66.5 0.0	
17.2	38.51 .41	48.1 1.5	2.83 .14	41.3 -0.2	45.12 .28	80.3 1.0	28.34 .17	66.4 -0.4	
27.2	38.11 .38	46.4 2.0	2.69 .14	40.9 0.6	44.85 .27	79.1 1.4	28.17 .17	65.8 0.8	
Sept. 6.1	37.74 -34	44.1 -2.4	2.56 -12	40.2 -0.8	44.59 -24	77.4 -1.9	28.01 -13	64.8 -1.1	
16.1	37.42 .29	41.6 2.8	2.44 .10	39.2 1.1	44.36 .21	75.4 2.3	27.86 .13	63.6 1.5	
26.1	37.16 .23	38.6 3.1	2.36 .07	37.9 1.4	44.17 .17	72.9 2.7	27.75 .10	61.9 1.8	
Oct. 6.1	36.96 .16	35.3 3.4	2.31 -03	36.3 1.7	44.02 .12	70.1 3.0	27.66 .06	59.9 2.1	
26.0	36.84 -07	31.8 3.6	2.29 +01	34.4 2.0	43.93 -06	66.9 3.3	27.62 -02	57.6 2.4	
	26.0	36.81 +02	28.1 -3.7	2.32 +06	32.3 -2.2	43.90 .00	63.5 -3.5	27.62 +03	55.1 -2.7
Nov. 5.0	36.88 .11	24.2 3.8	2.40 .11	30.0 2.4	43.94 +07	60.0 3.6	27.68 .08	52.3 2.9	
24.9	37.03 .20	20.5 3.7	2.54 .15	27.5 2.6	44.05 .14	56.4 3.6	27.78 .13	49.4 3.0	
24.9	37.28 .30	16.8 3.6	2.71 .20	24.8 2.7	44.23 .21	52.7 3.6	27.95 .19	46.3 3.0	
Dec. 4.9	37.63 .38	13.3 3.4	2.94 .24	22.1 2.7	44.48 .28	49.2 3.4	28.16 .24	43.3 3.0	
	14.9	38.05 +46	10.1 -3.0	3.20 +2.8	19.4 -2.7	44.78 +33	45.8 -3.2	28.42 +2.8	40.3 -2.9
	24.8	38.54 .52	7.3 2.5	3.50 .31	16.8 2.5	45.14 .38	42.8 2.8	28.71 .31	37.4 2.7
	34.8	39.09 +57	5.0 -2.0	3.81 +3.2	14.3 -2.5	45.55 +42	40.2 -2.4	29.04 +34	34.9 -2.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	5 Ursæ Minoris.		α Centauri (mean.)		ε Bootis.		α Libræ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 14 27	° ' +76 8	h m 14 32	° ' -60 24	h m 14 40	° ' +27 29	h m 14 45	° ' -15 37
	"	"	"	"	"	"	"	"
(Dec. 30.8)	42.46 +.82	32.6 -2.4	39.89 +.56	44.2 +0.1	32.14 +.32	58.2 -2.6	14.27 +.33	8.7 -1.5
Jan. 9.8	43.34 .91	30.5 1.8	40.46 .58	44.4 -0.4	32.47 .33	55.8 2.3	14.61 .34	10.2 1.6
19.8	44.28 .96	29.0 1.1	41.05 .58	45.0 0.9	32.81 .34	53.7 1.9	14.95 .34	11.8 1.6
29.7	45.24 .97	28.3 -0.5	41.63 .57	46.2 1.3	33.16 .34	52.0 1.4	15.29 .34	13.5 1.6
Feb. 8.7	46.21 .95	28.1 +0.2	42.20 .55	47.7 1.7	33.49 .33	50.9 0.9	15.62 .32	15.1 1.5
18.7	47.14 +.90	28.7 +0.9	42.74 +.52	49.6 -2.0	33.81 +.31	50.2 -0.4	15.94 +.30	16.6 -1.4
28.7	47.99 .81	29.9 1.5	43.24 .48	51.7 2.3	34.11 .28	50.0 +0.1	16.23 .28	17.9 1.3
Mar. 10.6	48.74 .70	31.7 2.0	43.69 .43	54.1 2.5	34.38 .25	50.4 0.6	16.50 .26	19.2 1.1
20.6	49.38 .56	33.9 2.5	44.10 .38	56.7 2.7	34.62 .22	51.2 1.0	16.74 .23	20.2 1.0
30.6	49.86 .41	36.6 2.8	44.44 .32	59.5 2.8	34.82 .18	52.4 1.4	16.95 .20	21.1 0.8
Apr. 9.6	50.19 +.25	39.6 +3.0	44.73 +.26	62.3 -2.8	34.98 +.15	54.0 +1.7	17.13 +.17	21.8 -0.6
19.5	50.36 +.09	42.7 3.2	44.96 .20	65.1 2.8	35.11 .11	55.8 1.9	17.28 .14	22.3 0.4
29.5	50.38 -.07	45.9 3.2	45.13 .14	67.8 2.7	35.20 .08	57.8 2.1	17.41 .11	22.6 0.3
May 9.5	50.23 .22	49.0 3.1	45.24 .08	70.5 2.6	35.26 .04	59.9 2.1	17.50 .08	22.8 -0.2
19.4	49.94 .36	52.0 2.8	45.28 +.02	73.0 2.4	35.28 +.01	62.0 2.1	17.56 .05	22.9 0.0
29.4	49.51 -.49	54.7 +2.5	45.27 -.04	75.3 -2.2	35.28 -.02	64.2 +2.0	17.60 +.02	22.9 +0.1
June 8.4	48.96 .60	57.1 2.1	45.18 .10	77.3 1.9	35.24 .05	66.1 1.9	17.61 -.01	22.8 0.2
18.4	48.31 .70	59.0 1.7	45.05 .16	79.0 1.6	35.17 .08	67.9 1.7	17.59 .04	22.6 0.2
28.3	47.57 .77	60.5 1.2	44.86 .21	80.4 1.2	35.08 .10	69.4 1.4	17.54 .06	22.3 0.3
July 8.3	46.77 .83	61.5 0.7	44.63 .25	81.5 0.8	34.96 .13	70.7 1.1	17.47 .08	22.0 0.4
18.3	45.92 -.86	61.9 +0.2	44.36 -.29	82.1 -0.4	34.83 -.14	71.7 +0.8	17.37 -.10	21.6 +0.4
28.3	45.04 .88	61.8 -0.3	44.05 .32	82.3 0.0	34.67 .16	72.4 0.5	17.26 .12	21.1 0.5
Aug. 7.2	44.16 .88	61.2 0.9	43.72 .33	82.1 +0.5	34.51 .17	72.7 +0.1	17.12 .13	20.6 0.5
17.2	43.29 .85	60.1 1.4	43.39 .33	81.4 0.9	34.34 .17	72.7 -0.2	16.99 .14	20.1 0.6
27.2	42.45 .81	58.4 1.9	43.06 .32	80.3 1.3	34.17 .17	72.3 0.6	16.85 .14	19.5 0.6
Sept. 6.1	41.67 -.75	56.3 -2.3	42.76 -.29	78.8 +1.7	34.01 -.15	71.6 -0.9	16.71 -.13	18.9 +0.5
16.1	40.96 .66	53.8 2.7	42.49 .24	77.0 2.0	33.86 .14	70.5 1.3	16.59 .11	18.4 0.5
26.1	40.35 .56	50.9 3.1	42.27 .18	74.9 2.2	33.74 .11	69.0 1.6	16.50 .08	17.9 0.4
Oct. 6.1	39.84 .44	47.6 3.4	42.13 .11	72.5 2.4	33.64 .07	67.3 1.9	16.43 -.05	17.6 0.3
16.0	39.46 .31	44.1 3.6	42.06 -.02	70.1 2.4	33.59 -.03	65.2 2.2	16.40 .00	17.3 +0.2
26.0	39.23 +.16	40.4 -3.8	42.08 +.07	67.6 +2.4	33.58 +.02	62.9 -2.5	16.42 +.04	17.2 0.0
Nov. 5.0	39.15 .00	36.6 3.8	42.19 .16	65.3 2.2	33.63 .07	60.3 2.7	16.49 .09	17.4 -0.3
15.0	39.23 +.17	32.8 3.8	42.39 .25	63.2 2.0	33.72 .12	57.5 2.8	16.61 .15	17.8 0.5
24.9	39.48 .33	29.0 3.7	42.69 .34	61.3 1.7	33.87 .17	54.6 2.9	16.78 .19	18.4 0.7
Dec. 4.9	39.89 .49	25.4 3.4	43.08 .42	59.8 1.5	34.07 .22	51.6 2.9	17.00 .24	19.2 1.0
14.9	40.46 +.63	22.2 -3.1	43.53 +.48	58.7 +0.8	34.31 +.26	48.7 -2.9	17.26 +.28	20.3 -1.2
24.8	41.16 .76	19.3 2.6	44.04 .53	58.1 +0.4	34.60 .30	45.9 2.7	17.55 .31	21.6 1.4
34.8	41.97 +.86	16.9 -2.1	44.59 +.56	58.0 -0.1	34.91 +.32	43.3 -2.5	17.87 +.33	23.0 -1.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Ursæ Minoris.		$\beta$ Bootis.		$\beta$ Libræ.		$\mu^1$ Bootis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	h m 14 50	° ' " +74 33	h m 14 58	° ' " +40 47	h m 15 11	° ' " - 9 0	h m 15 20	° ' " +37 43
(Dec. 30.8)	57.82 +.74	56.3 -2.6	6.08 +.33	14.7 -2.8	31.15 +.30	29.9 -1.6	37.96 +.30	48.1 -2.8
Jan. 9.8	58.57 .79	54.0 2.1	6.43 .36	12.1 2.4	31.46 .32	31.5 1.6	38.28 .33	45.4 2.5
19.8	59.40 .84	52.2 1.5	6.79 .37	9.9 1.9	31.79 .33	33.1 1.6	38.62 .35	43.0 2.1
29.8	60.26 .87	51.1 0.8	7.17 .38	8.2 1.4	32.12 .33	34.7 1.5	38.98 .36	41.2 1.6
Feb. 8.7	61.14 .87	50.6 -0.1	7.54 .37	7.1 0.8	32.44 .32	36.2 1.4	39.34 .36	39.9 1.0
18.7	62.00 +.83	50.9 +0.6	7.91 +.35	6.6 -0.2	32.76 +.31	37.5 -1.2	39.70 +.35	39.1 -0.5
28.7	62.80 .77	51.7 1.2	8.25 .33	6.7 +0.4	33.06 .29	38.6 1.0	40.03 .33	39.0 +0.1
Mar. 10.7	63.54 .68	53.2 1.8	8.56 .29	7.3 0.9	33.33 .26	39.5 0.8	40.35 .30	39.4 0.7
20.6	64.17 .57	55.3 2.3	8.84 .26	8.5 1.4	33.58 .24	40.2 0.6	40.63 .27	40.3 1.2
30.6	64.68 .44	57.8 2.7	9.07 .22	10.2 1.9	33.81 .21	40.7 0.3	40.88 .23	41.8 1.7
Apr. 9.6	65.06 +.31	60.6 +3.0	9.27 +.17	12.3 +2.2	34.01 +.19	40.9 -0.1	41.10 +.19	43.7 +2.0
19.5	65.30 .17	63.7 3.1	9.42 .13	14.6 2.5	34.18 .16	41.0 0.0	41.27 .15	45.9 2.3
29.5	65.39 +.03	66.9 3.2	9.53 .09	17.2 2.6	34.32 .13	40.8 +0.2	41.41 .11	48.4 2.5
May 9.5	65.35 -.11	70.2 3.1	9.59 +.04	19.8 2.7	34.44 .10	40.6 0.3	41.50 .07	51.0 2.6
19.5	65.16 .25	73.2 3.0	9.61 .00	22.5 2.6	34.52 .07	40.2 0.4	41.55 +.03	53.6 2.6
29.4	64.86 -.37	76.1 +2.7	9.60 -.04	25.1 +2.5	34.58 +.04	39.8 +0.5	41.57 -.01	56.2 +2.6
June 8.4	64.43 .48	78.7 2.4	9.54 .07	27.5 2.3	34.61 +.01	39.3 0.5	41.54 .04	58.8 2.4
18.4	63.90 .57	80.9 2.0	9.45 .11	29.7 2.0	34.60 -.02	38.8 0.5	41.48 .08	61.1 2.2
28.4	63.28 .65	82.7 1.6	9.32 .14	31.6 1.7	34.57 .04	38.2 0.5	41.38 .11	63.1 1.9
July 8.3	62.59 .72	84.0 1.1	9.17 .17	33.2 1.4	34.52 .07	37.6 0.5	41.25 .14	64.8 1.6
18.3	61.85 -.76	84.9 +0.5	8.99 -.19	34.4 +1.0	34.43 -.10	37.1 +0.5	41.09 -.17	66.2 +1.4
28.3	61.07 .79	85.2 0.0	8.79 .21	35.1 0.6	34.32 .12	36.6 0.5	40.91 .19	67.3 0.8
Aug. 7.3	60.27 .80	84.9 -0.5	8.57 .22	35.5 +0.1	34.20 .13	36.1 0.5	40.71 .21	67.9 +0.4
17.2	59.46 .80	84.2 1.0	8.35 .22	35.4 -0.3	34.06 .14	35.6 0.5	40.49 .22	68.1 0.0
27.2	58.67 .77	82.9 1.5	8.12 .22	34.9 0.7	33.92 .14	35.2 0.4	40.27 .22	67.8 -0.5
Sept. 6.2	57.92 -.72	81.1 -2.0	7.90 -.21	33.9 -1.2	33.78 -.14	34.8 +0.3	40.05 -.21	67.2 -0.9
16.1	57.23 .66	78.9 2.4	7.70 .19	32.5 1.6	33.61 .12	34.5 0.2	39.84 .20	66.1 1.3
26.1	56.61 .57	76.2 2.8	7.52 .16	30.7 2.0	33.53 .10	34.4 +0.1	39.66 .17	64.6 1.7
Oct. 6.1	56.08 .47	73.2 3.2	7.38 .12	28.5 2.4	33.44 .07	34.3 0.0	39.50 .14	62.7 2.1
16.1	55.66 .36	69.9 3.5	7.28 .08	26.0 2.7	33.39 -.03	34.4 -0.2	39.38 .10	60.4 2.4
26.0	55.37 -.22	66.3 -3.7	7.22 -.02	23.2 -3.0	33.38 +.01	34.7 -0.4	39.31 -.05	57.8 -2.7
Nov. 5.0	55.21 -.08	62.5 3.8	7.23 +.03	20.1 3.2	33.42 .06	35.2 0.6	39.29 +.01	55.0 3.0
15.0	55.21 +.07	58.7 3.8	7.29 .09	16.8 3.3	33.51 .11	35.9 0.8	39.32 .06	51.9 3.2
24.9	55.35 .22	54.9 3.7	7.41 .15	13.5 3.4	33.65 .16	36.9 1.0	39.42 .12	48.6 3.3
Dec. 4.9	55.65 .37	51.3 3.6	7.59 .21	10.1 3.3	33.84 .21	38.0 1.2	39.57 .18	45.3 3.3
14.9	56.09 +.51	47.8 -3.3	7.83 +.26	6.8 -3.2	34.07 +.25	39.3 -1.4	39.78 +.23	42.0 -3.2
24.9	56.66 .63	44.7 2.9	8.11 .30	3.6 3.0	34.34 .28	40.8 1.5	40.03 .28	38.9 3.0
34.8	57.35 +.73	42.1 -2.4	8.44 +.34	0.8 -2.6	34.63 +.30	42.3 -1.5	40.33 +.31	36.0 -2.8

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma^2$ Ursæ Minoris.		$\alpha$ Coronæ Borealis.		$\alpha$ Serpentis.		$\epsilon$ Serpentis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 15 20	° ' " +72 11	h m 15 30	° ' " +27 3	h m 15 39	° ' " + 6 44	h m 15 45	° ' " + 4 46
(Dec. 30.9)	50.94 +.55	26.9 -2.9	21.99 +.29	13.4 -2.7	14.56 +.27	37.1 -2.1	43.80 +.27	56.0 -2.0
Jan. 9.8	51.54 .64	24.2 2.4	22.29 .31	10.8 2.5	14.84 .29	35.1 2.0	44.09 .29	54.0 1.9
19.8	52.22 .71	22.1 1.8	22.60 .32	8.5 2.1	15.15 .31	33.1 1.8	44.39 .31	52.1 1.8
29.8	52.96 .75	20.6 1.2	22.94 .33	6.6 1.7	15.46 .32	31.4 1.6	44.70 .31	50.4 1.6
Feb. 8.8	53.73 .77	19.7 -0.5	23.27 .33	5.2 1.2	15.78 .31	30.0 1.3	45.02 .31	49.0 1.3
18.7	54.50 +.75	19.5 +0.1	23.60 +.32	4.2 -0.7	16.09 +.30	28.8 -1.0	45.33 +.31	47.8 -1.0
28.7	55.23 .71	20.0 0.8	23.91 .31	3.8 -0.2	16.39 .29	28.0 0.6	45.63 .29	47.0 0.7
Mar. 10.7	55.92 .65	21.1 1.4	24.21 .28	3.8 +0.3	16.67 .27	27.5 -0.3	45.92 .27	46.5 -0.3
20.7	56.54 .57	22.8 2.0	24.48 .26	4.4 0.8	16.93 .25	27.4 +0.1	46.18 .25	46.4 0.0
30.6	57.06 .47	25.0 2.4	24.72 .23	5.5 1.2	17.17 .23	27.7 0.4	46.42 .23	46.6 +0.3
Apr. 9.6	57.48 +.36	27.7 +2.8	24.94 +.19	6.9 +1.6	17.39 +.20	28.3 +0.7	46.64 +.21	47.0 +0.6
19.6	57.79 .24	30.7 3.1	25.11 .16	8.7 1.9	17.57 .17	29.1 1.0	46.84 .18	47.8 0.9
29.5	57.97 +.12	33.8 3.2	25.26 .13	10.7 2.1	17.73 .14	30.2 1.1	47.00 .15	48.8 1.0
May 9.5	58.03 .00	37.1 3.2	25.37 .09	12.9 2.2	17.86 .12	31.4 1.3	47.14 .12	49.9 1.2
19.5	57.97 -1.12	40.3 3.2	25.44 .06	15.2 2.3	17.96 .09	32.7 1.4	47.24 .09	51.2 1.3
June 29.5	57.80 -0.23	43.4 +3.0	25.48 +.02	17.5 +2.3	18.03 +.06	34.1 +1.4	47.32 +.06	52.5 +1.3
8.4	57.51 .33	46.2 2.7	25.49 -0.01	19.7 2.2	18.07 +.02	35.5 1.4	47.37 +.03	53.8 1.3
18.4	57.13 .43	48.8 2.4	25.46 .04	21.8 2.0	18.08 -0.01	36.8 1.3	47.39 .00	55.0 1.2
28.4	56.66 .51	51.0 2.0	25.40 .07	23.7 1.8	18.06 .04	38.1 1.2	47.37 -0.03	56.2 1.2
July 8.4	56.11 .58	52.7 1.5	25.31 .10	25.3 1.5	18.00 .06	39.2 1.1	47.32 .06	57.4 1.0
18.3	55.50 -0.64	54.0 +1.0	25.19 -1.13	26.7 +1.2	17.93 -0.09	40.2 +0.9	47.25 -0.09	58.3 +0.9
28.3	54.84 .68	54.8 +0.5	25.05 .15	27.7 0.9	17.82 .12	41.1 0.8	47.15 .11	59.2 0.8
Ang. 7.3	54.15 .70	55.0 0.0	24.89 .17	28.5 0.5	17.69 .13	41.8 0.6	47.02 .13	59.9 0.6
17.2	53.44 .71	54.7 -0.5	24.71 .18	28.8 +0.2	17.55 .15	42.3 0.4	46.88 .15	60.4 0.4
27.2	52.73 .70	53.9 1.1	24.52 .19	28.8 -0.2	17.40 .15	42.6 +0.2	46.73 .15	60.7 +0.2
Sept. 6.2	52.04 -0.67	52.6 -1.6	24.34 -1.18	28.5 -0.5	17.24 -1.15	42.7 0.0	46.58 -1.15	60.8 0.0
16.2	51.38 .63	50.8 2.0	24.16 .17	27.8 0.9	17.09 .14	42.5 -0.2	46.42 .14	60.8 -0.2
26.1	50.77 .57	48.6 2.5	24.00 .15	26.7 1.3	16.96 .12	42.2 0.5	46.28 .13	60.5 0.4
Oct. 6.1	50.24 .49	45.9 2.9	23.86 .12	25.2 1.6	16.84 .10	41.6 0.7	46.17 .10	60.0 0.6
16.1	49.79 .39	42.8 3.2	23.76 .08	23.4 2.0	16.76 .06	40.7 1.0	46.08 .07	59.3 0.9
Nov. 26.1	49.45 -0.28	39.5 -3.5	23.70 -0.04	21.3 -2.2	16.72 -0.02	39.6 -1.2	46.04 -0.03	58.3 -1.1
5.0	49.23 .16	35.9 3.7	23.68 +0.01	19.0 2.5	16.72 +0.02	38.3 1.4	46.03 +0.02	57.1 1.3
15.0	49.13 -0.03	32.2 3.8	23.72 .07	16.3 2.7	16.77 .07	36.7 1.7	46.08 .07	55.6 1.5
25.0	49.17 +1.11	28.4 3.8	23.82 .12	13.5 2.9	16.87 .12	34.9 1.9	46.17 .12	54.0 1.7
Dec. 4.9	49.34 .24	24.7 3.7	23.96 .17	10.6 2.9	17.02 .17	33.0 2.0	46.32 .17	52.2 1.9
14.9	49.65 +.37	21.1 -3.5	24.16 +.22	7.7 -2.9	17.21 +.21	30.9 -2.1	46.51 +.21	50.2 -2.0
24.9	50.09 .49	17.7 3.1	24.40 .26	4.7 2.8	17.44 .25	28.8 2.1	46.74 .25	48.2 2.0
34.9	50.63 +.59	14.8 -2.7	24.67 +.29	2.0 -2.6	17.71 +.28	26.7 -2.1	47.00 +.28	46.2 -2.0

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	ζ Ursæ Minoris.		ε Coronæ Borealis.		δ Scorpïi.		β <sup>1</sup> Scorpïi.		
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	
	h m 15 47	° ' " +78 5	h m 15 53	° ' " +27 9	h m 15 54	° ' " -22 19	h m 15 59	° ' " -19 31	
	s	"	s	"	s	"	s	"	
(Dec. 30.9)	37.11+ .66	69.4 -3.0	21.63 +.86	69.5 -2.8	18.01 +.30	55.9 -0.8	30.24 +.28	38.3 -0.9	
Jan. 9.9	37.86 .82	66.6 2.6	21.91 .29	66.9 2.5	18.32 .32	56.7 0.9	30.54 .31	39.3 1.0	
19.8	38.74 .94	64.2 2.1	22.22 .31	64.5 2.2	18.65 .34	57.7 1.0	30.87 .33	40.3 1.1	
29.8	39.74 1.03	62.4 1.5	22.54 .32	62.5 1.8	18.99 .34	58.8 1.1	31.20 .34	41.4 1.1	
Feb. 8.8	40.80 1.08	61.3 0.8	22.87 .33	60.9 1.3	19.34 .34	59.9 1.1	31.54 .34	42.5 1.1	
	18.7	41.89+1.09	60.8 -0.1	23.20 +.32	59.8 -0.8	19.68 +.34	61.0 -1.1	31.88 +.33	43.6 -1.0
	28.7	42.97 1.05	61.1 +0.5	23.51 .31	59.3 -0.3	20.01 .32	62.0 1.0	32.20 .32	44.6 0.9
Mar. 10.7	44.00 .99	61.9 1.2	23.82 .29	59.2 +0.2	20.33 .31	63.0 0.9	32.52 .30	45.5 0.8	
20.7	44.95 .89	63.4 1.8	24.10 .27	59.7 0.7	20.62 .29	63.9 0.8	32.81 .28	46.2 0.7	
30.6	45.77 .76	65.4 2.3	24.36 .24	60.7 1.2	20.90 .26	64.6 0.7	33.08 .26	46.9 0.6	
Apr. 9.6	46.46+ .60	68.0 +2.7	24.59 +.21	62.1 +1.6	21.15 +.24	65.3 -0.6	33.34 +.24	47.4 -0.5	
19.6	46.98 .43	70.8 3.0	24.79 .18	63.9 1.9	21.38 .21	65.9 0.5	33.56 .21	47.8 0.4	
29.6	47.32 .25	73.9 3.2	24.96 .15	65.9 2.1	21.58 .18	66.4 0.4	33.76 .19	48.1 0.2	
May 9.5	47.49+ .07	77.1 3.3	25.09 .12	68.1 2.3	21.75 .15	66.7 0.3	33.94 .16	48.3 0.2	
19.5	47.46- .11	80.4 3.2	25.19 .08	70.5 2.4	21.89 .12	67.0 0.3	34.08 .13	48.5 -0.1	
	29.5	47.26- .29	83.6 +3.1	25.25 +.04	72.8 +2.4	22.00 +.09	67.3 -0.2	34.19 +.09	48.5 0.0
June 8.4	46.88 .46	86.6 2.9	25.28 +.01	75.2 2.3	22.07 .06	67.5 -0.1	34.26 .06	48.5 0.0	
18.4	46.35 .61	89.3 2.6	25.27 -0.02	77.4 2.1	22.11 +.02	67.6 0.0	34.30 +.02	48.5 +0.1	
28.4	45.66 .75	91.7 2.2	25.23 .06	79.4 1.9	22.11 -0.01	67.6 0.0	34.31 -0.01	48.4 0.1	
July 8.4	44.86 .86	93.8 1.8	25.15 .09	81.2 1.7	22.08 .05	67.6 +0.1	34.28 .05	48.2 0.2	
	18.3	43.94- .96	95.3 +1.3	25.04 -0.12	82.8 +1.4	22.01 -0.08	67.5 +0.1	34.22 -0.08	48.1 +0.2
	28.3	42.93 1.04	96.4 0.8	24.91 .15	84.1 1.1	21.92 .11	67.4 0.2	34.13 .11	47.9 0.2
Aug. 7.3	41.87 1.09	96.9 +0.3	24.75 .17	85.0 0.7	21.79 .13	67.2 0.3	34.01 .13	47.6 0.3	
17.3	40.76 1.11	97.0 -0.2	24.57 .18	85.5 +0.4	21.65 .15	66.8 0.4	33.87 .15	47.2 0.4	
27.2	39.64 1.12	96.5 0.7	24.38 .19	85.7 0.0	21.49 .16	66.4 0.4	33.72 .16	46.9 0.4	
Sept. 6.2	38.53-1.09	95.5 -1.2	24.18 -0.19	85.5 -0.4	21.32 -0.16	66.0 +0.5	33.56 -0.16	46.4 +0.4	
16.2	37.45 1.04	94.1 1.7	23.99 .18	85.0 0.7	21.16 .15	65.5 0.5	33.39 .15	46.0 0.4	
26.1	36.44 .97	92.1 2.2	23.81 .17	84.1 1.1	21.02 .13	64.9 0.6	33.25 .13	45.5 0.4	
Oct. 6.1	35.52 .86	89.7 2.6	23.66 .14	82.8 1.5	20.90 .11	64.4 0.5	33.12 .11	45.1 0.4	
16.1	34.72 .74	86.9 3.0	23.54 .10	81.1 1.8	20.81 .07	63.8 0.5	33.03 .07	44.7 0.4	
	26.1	34.05- .58	83.8 -3.3	23.45 -0.06	79.2 -2.1	20.76 -0.02	63.4 +0.4	32.98 -0.03	44.4 +0.3
Nov. 5.0	33.55 .41	80.4 3.5	23.42 -0.01	76.9 2.4	20.76 +0.03	63.0 0.3	32.98 +0.02	44.2 +0.1	
15.0	33.22 .23	76.8 3.6	23.43 +0.04	74.3 2.6	20.82 .08	62.8 +0.1	33.02 .07	44.2 0.0	
25.0	33.10- .03	73.2 3.7	23.49 .09	71.6 2.8	20.92 .13	62.8 -0.1	33.12 .13	44.3 -0.2	
Dec. 5.0	33.16+ .17	69.4 3.7	23.61 .15	68.7 2.9	21.08 .19	63.0 0.3	33.28 .18	44.6 0.4	
	14.9	33.44+ .37	65.8 -3.5	23.78 +.19	65.7 -2.9	21.30 +.23	63.3 -0.4	33.48 +.22	45.1 -0.6
	24.9	33.90 .56	62.4 3.2	24.00 .24	62.8 2.8	21.55 .27	63.8 0.6	33.72 .26	45.8 0.8
	34.9	34.55+ .73	59.4 -2.9	24.26 +.27	60.0 -2.7	21.84 +.30	64.6 -0.8	34.00 +.29	46.6 -1.0



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	Groombridge 2320.		$\delta$ Ophiuchi.		$\tau$ Herculis.		$\eta$ Draconis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 16 5	<sup>°</sup> <sup>'</sup> +68 4	<sup>h</sup> <sup>m</sup> 16 8	<sup>°</sup> <sup>'</sup> — 3 25	<sup>h</sup> <sup>m</sup> 16 16	<sup>°</sup> <sup>'</sup> +46 32	<sup>h</sup> <sup>m</sup> 16 22	<sup>°</sup> <sup>'</sup> +61 44
	<sup>s</sup>	<sup>"</sup>	<sup>s</sup>	<sup>"</sup>	<sup>s</sup>	<sup>"</sup>	<sup>s</sup>	<sup>"</sup>
(Dec. 30.9)	59.80 +.39	25.7 -3.2	59.87 +.26	61.1 -1.6	39.56 +.26	66.0 -3.2	34.77 +.30	25.2 -3.4
Jan. 9.9	60.23 .47	22.6 2.9	60.14 .28	62.7 1.6	39.85 .31	62.9 2.9	35.11 .37	22.0 3.0
19.8	60.74 .54	19.9 2.4	60.43 .30	64.3 1.5	40.18 .34	60.2 2.5	35.52 .43	19.2 2.6
29.8	61.31 .60	17.8 1.8	60.74 .31	65.8 1.4	40.54 .37	57.9 2.0	35.98 .48	16.9 2.0
Feb. 8.8	61.93 .63	16.3 1.2	61.06 .31	67.1 1.2	40.91 .38	56.2 1.4	36.47 .50	15.1 1.4
18.8	62.56 +.64	15.5 -0.5	61.37 +.31	68.2 -1.0	41.30 +.39	55.0 -0.8	36.99 +.52	14.1 -0.8
28.7	63.20 .63	15.4 +0.2	61.68 .30	69.1 0.7	41.68 .38	54.6 -0.2	37.50 .51	13.6 -0.1
Mar. 10.7	63.81 .59	15.9 0.9	61.97 .29	69.7 0.5	42.06 .36	54.7 +0.4	38.01 .49	13.9 +0.6
20.7	64.38 .54	17.1 1.5	62.25 .27	70.0 -0.2	42.41 .34	55.4 1.0	38.49 .46	14.8 1.2
30.7	64.90 .48	18.8 2.0	62.51 .25	70.1 +0.1	42.74 .31	56.8 1.6	38.93 .41	16.4 1.8
Apr. 9.6	65.34 +.40	21.1 +2.5	62.75 +.23	69.9 +0.3	43.02 +.27	58.6 +2.1	39.32 +.36	18.4 +2.3
19.6	65.70 .32	23.8 2.9	62.96 .20	69.5 0.5	43.28 .23	60.9 2.5	39.65 .30	21.0 2.7
29.6	65.98 .23	26.8 3.1	63.16 .18	68.9 0.7	43.48 .18	63.6 2.8	39.92 .23	23.8 3.0
May 9.5	66.15 .13	30.1 3.3	63.32 .15	68.2 0.8	43.65 .14	66.4 2.9	40.11 .16	27.0 3.2
19.5	66.23 +.03	33.4 3.3	63.46 .12	67.3 0.9	43.76 .09	69.5 3.0	40.23 .08	30.3 3.3
29.5	66.22 -0.6	36.7 +3.2	63.56 +.09	66.4 +0.9	43.83 +.04	72.5 +3.0	40.28 +.01	33.6 +3.3
June 8.5	66.10 .16	39.8 3.1	63.64 .06	65.5 0.9	43.84 -0.1	75.5 2.9	40.25 -0.7	36.8 3.2
18.4	65.90 .24	42.8 2.8	63.68 +0.2	64.6 0.9	43.81 .06	78.4 2.8	40.14 .14	39.9 3.0
28.4	65.61 .33	45.5 2.5	63.68 -0.1	63.6 0.9	43.73 .10	81.0 2.5	39.97 .21	42.7 2.7
July 8.4	65.25 .40	47.8 2.1	63.66 .04	62.8 0.8	43.60 .15	83.4 2.2	39.73 .27	45.2 2.3
18.4	64.81 -0.46	49.7 +1.7	63.60 -0.7	62.0 +0.7	43.43 -0.19	85.4 +1.8	39.43 -0.32	47.4 +1.9
28.3	64.32 .51	51.2 1.2	63.52 .10	61.4 0.6	43.22 .22	87.1 1.4	39.08 .37	49.1 1.5
Aug. 7.3	63.78 .55	52.2 0.7	63.40 .12	60.8 0.6	42.98 .25	88.3 1.0	38.68 .41	50.4 1.0
17.3	63.21 .58	52.6 +0.2	63.27 .14	60.2 0.5	42.72 .27	89.0 +0.5	38.26 .44	51.1 +0.5
27.2	62.62 .59	52.6 -0.3	63.12 .15	59.8 0.3	42.44 .28	89.3 0.0	37.81 .45	51.4 0.0
Sept. 6.2	62.03 -0.59	52.0 -0.8	62.96 -0.16	59.6 +0.2	42.15 -0.29	89.1 -0.4	37.35 -0.46	51.1 -0.5
16.2	61.44 .57	50.9 1.3	62.80 .15	59.4 +0.1	41.87 .28	88.4 0.9	36.89 .45	50.3 1.0
26.2	60.89 .53	49.3 1.8	62.66 .14	59.4 -0.1	41.59 .26	87.3 1.4	36.46 .42	49.0 1.5
Oct. 6.1	60.38 .48	47.2 2.3	62.53 .11	59.6 0.2	41.34 .23	85.7 1.8	36.05 .38	47.2 2.0
16.1	59.93 .41	44.7 2.7	62.43 .08	59.9 0.4	41.13 .19	83.7 2.2	35.69 .33	45.0 2.4
26.1	59.56 -0.33	41.8 -3.0	62.37 -0.04	60.4 -0.6	40.96 -0.14	81.2 -2.6	35.39 -0.27	42.3 -2.8
Nov. 5.1	59.28 .23	38.6 3.3	62.35 +0.01	61.1 0.8	40.84 .09	78.4 2.9	35.15 .19	39.3 3.2
15.0	59.10 .13	35.1 3.6	62.38 .05	62.0 1.0	40.78 -0.03	75.4 3.2	35.00 .11	36.0 3.4
25.0	59.02 -0.1	31.4 3.7	62.46 .10	63.1 1.2	40.78 +0.4	72.0 3.4	34.94 -0.2	32.4 3.6
Dec. 5.0	59.07 +.10	27.7 3.7	62.59 .15	64.4 1.4	40.85 .10	68.6 3.5	34.96 +.07	28.8 3.7
14.9	59.23 +.21	24.0 -3.6	62.76 +.19	65.8 -1.5	40.99 +.17	65.1 -3.5	35.08 +.16	25.1 -3.6
24.9	59.50 .32	20.4 3.4	62.98 .23	67.4 1.6	41.19 .23	61.7 3.3	35.29 .25	21.5 3.5
34.9	59.87 +.42	17.2 -3.1	63.23 +.27	69.0 -1.6	41.44 +.28	58.4 -3.1	35.58 +.33	18.1 -3.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Scorpii. (Antares.)		$\beta$ Herculis.		$\Lambda$ Draconis.		$\zeta$ Ophiuchi.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 16 23	<sup>°</sup> <sup>'</sup> —26 12	<sup>h</sup> <sup>m</sup> 16 25	<sup>°</sup> <sup>'</sup> +21 42	<sup>h</sup> <sup>m</sup> 16 28	<sup>°</sup> <sup>'</sup> +68 58	<sup>h</sup> <sup>m</sup> 16 31	<sup>°</sup> <sup>'</sup> —10 21
(Dec. 30.9)	8.96 +.28	22.8 —0.4	49.71 +.23	31.2 —2.7	8.13 +.34	62.3 —3.4	32.33 +.25	43.3 —1.2
Jan. 9.9	9.26 .31	23.3 0.5	49.96 .27	28.6 2.4	8.52 .44	59.0 3.0	32.59 .28	44.5 1.2
19.9	9.58 .33	23.9 0.7	50.24 .29	26.3 2.2	9.01 .52	56.2 2.6	32.88 .30	45.7 1.2
29.8	9.92 .35	24.6 0.7	50.54 .31	24.2 1.9	9.57 .59	53.9 2.0	33.18 .31	46.9 1.1
Feb. 8.8	10.27 .35	25.4 0.8	50.86 .31	22.6 1.4	10.18 .63	52.2 1.4	33.50 .32	48.0 1.0
18.8	10.62 +.35	26.2 —0.8	51.17 +.31	21.4 —1.0	10.83 +.65	51.1 —0.7	33.82 +.32	48.9 —0.9
28.7	10.97 .34	27.0 0.8	51.48 .31	20.6 —0.5	11.49 .65	50.7 —0.1	34.13 .31	49.7 0.7
Mar. 10.7	11.30 .33	27.8 0.8	51.79 .30	20.3 0.0	12.13 .65	51.0 +0.6	34.44 .30	50.4 0.5
20.7	11.62 .31	28.6 0.7	52.08 .28	20.6 +0.5	12.75 .59	51.9 1.2	34.73 .29	50.8 0.3
30.7	11.93 .29	29.3 0.7	52.35 .26	21.3 0.9	13.31 .53	53.4 1.8	35.01 .27	51.0 —0.1
Apr. 9.6	12.21 +.27	29.9 —0.6	52.60 +.24	22.4 +1.3	13.81 +.46	55.5 +2.3	35.27 +.25	51.0 +0.1
19.6	12.47 .25	30.5 0.5	52.82 .21	23.9 1.6	14.23 .38	58.1 2.7	35.51 .23	50.8 0.2
29.6	12.70 .22	31.0 0.5	53.02 .18	25.7 1.9	14.56 .29	61.0 3.0	35.73 .20	50.5 0.4
May 9.6	12.91 .19	31.5 0.4	53.19 .15	27.7 2.1	14.80 .19	64.2 3.2	35.92 .18	50.0 0.5
19.5	13.08 .16	31.9 0.4	53.32 .12	29.9 2.2	14.93 +.08	67.5 3.3	36.08 .15	49.5 0.6
29.5	13.22 +.12	32.3 —0.4	53.42 +.08	32.2 +2.2	14.97 —.02	70.8 +3.3	36.22 +.12	48.9 +0.6
June 8.5	13.32 .09	32.6 0.3	53.49 .05	34.4 2.2	14.90 .12	74.1 3.2	36.32 .08	48.3 0.6
18.4	13.39 .05	32.9 0.3	53.52 +.01	36.6 2.1	14.73 .21	77.2 3.0	36.38 .05	47.7 0.6
28.4	13.42 +.01	33.2 0.2	53.51 —.03	38.6 1.9	14.47 .30	80.1 2.7	36.41 +.01	47.1 0.6
July 8.4	13.41 —.02	33.4 0.2	53.47 .06	40.5 1.8	14.12 .39	82.6 2.4	36.41 —.02	46.5 0.6
18.4	13.36 —.07	33.5 —0.1	53.39 —.09	42.1 +1.5	13.70 —.46	84.8 +2.0	36.37 —.06	46.0 +0.5
28.3	13.28 .10	33.6 0.0	53.28 .12	43.5 1.2	13.20 .52	86.6 1.5	36.29 .09	45.5 0.5
Aug. 7.3	13.16 .13	33.5 +0.1	53.14 .15	44.6 1.0	12.66 .57	87.8 1.0	36.19 .12	45.0 0.4
17.3	13.02 .15	33.4 0.2	52.98 .17	45.4 0.6	12.06 .60	88.6 +0.5	36.06 .14	44.6 0.4
27.3	12.85 .17	33.1 0.3	52.80 .18	45.9 +0.3	11.45 .63	88.9 0.0	35.91 .15	44.2 0.3
Sept. 6.2	12.68 —.17	32.8 +0.4	52.62 —.19	46.0 0.0	10.81 —.63	88.6 —0.5	35.75 —.16	43.9 +0.3
16.2	12.50 .17	32.3 0.5	52.42 .19	45.8 —0.4	10.18 .62	87.9 1.0	35.59 .16	43.7 0.2
26.2	12.34 .15	31.8 0.6	52.24 .17	45.3 0.7	9.58 .59	86.6 1.5	35.43 .15	43.5 0.4
Oct. 6.1	12.20 .13	31.2 0.6	52.08 .15	44.4 1.1	9.01 .54	84.8 2.0	35.29 .13	43.4 0.0
16.1	12.08 .09	30.6 0.6	51.94 .12	43.1 1.4	8.50 .48	82.6 2.5	35.18 .09	43.4 —0.1
26.1	12.01 —.05	30.0 +0.6	51.84 —.08	41.5 —1.7	8.05 —.40	79.9 —2.8	35.10 —.06	43.6 —0.2
Nov. 5.1	11.98 .00	29.4 0.5	51.78 —.04	39.6 2.0	7.70 .30	76.9 3.2	35.07 —.01	43.9 0.4
15.0	12.01 +0.5	28.9 0.4	51.77 +.01	37.5 2.3	7.45 .20	73.5 3.4	35.08 +0.4	44.3 0.5
25.0	12.09 .11	28.6 0.3	51.80 .06	35.1 2.5	7.31 —.08	70.0 3.6	35.14 .09	44.9 0.7
Dec. 5.0	12.22 .16	28.4 +0.1	51.90 .12	32.5 2.6	7.29 +0.4	66.3 3.7	35.25 .14	45.7 0.9
15.0	12.41 +.21	28.4 —0.1	52.04 +.16	29.9 —2.7	7.39 +.16	62.6 —3.7	35.42 +.18	46.6 —1.0
24.9	12.64 .25	28.6 0.3	52.22 .21	27.2 2.7	7.60 .27	59.0 3.5	35.62 .22	47.7 1.1
34.9	12.92 +.29	28.9 —0.4	52.45 +.24	24.6 —2.6	7.93 +.38	55.6 —3.3	35.86 +.26	48.8 —1.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Trianguli Australis.		η Herculis.		κ Ophiuchi.		ε Ursæ Minoris.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 16 37	° ' -68 50	h m 16 39	° ' +39 6	h m 16 52	° ' + 9 31	h m 16 56	° ' +82 11
	s	"	s	"	s	"	s	"
(Dec. 30.9)	50.30 +.56	21.4 +1.9	23.08 +.22	45.0 -3.2	50.07 +.21	52.6 -2.1	14.57+ .49	64.2 -3.3
Jan. 9.9	50.90 .64	19.7 1.5	23.33 .27	42.0 2.9	50.30 .24	50.6 2.0	15.23 .79	61.0 3.1
19.8	51.58 .71	18.4 1.1	23.62 .30	39.2 2.6	50.56 .27	48.6 1.9	16.16 1.05	58.2 2.7
29.8	52.32 .75	17.5 0.7	23.94 .33	36.8 2.1	50.84 .29	46.8 1.7	17.33 1.27	55.7 2.2
Feb. 8.8	53.09 .78	17.0 +0.3	24.27 .34	34.9 1.6	51.13 .30	45.3 1.4	18.70 1.44	53.8 1.6
18.8	53.88 +.79	16.9 -0.1	24.62 +.35	33.6 -1.1	51.43 +.30	44.2 -1.0	20.20+1.55	52.5 -1.0
28.7	54.67 .79	17.3 0.5	24.97 .35	32.8 -0.5	51.74 .30	43.3 0.6	21.79 1.60	51.8 -0.4
Mar. 10.7	55.45 .77	18.0 0.9	25.32 .34	32.6 +0.1	52.03 .29	42.9 -0.2	23.39 1.58	51.8 +0.3
20.7	56.21 .74	19.1 1.2	25.65 .32	33.1 0.7	52.32 .28	42.8 +0.2	24.96 1.52	52.5 1.0
30.7	56.92 .69	20.5 1.5	25.96 .30	34.1 1.3	52.60 .27	43.8 0.5	26.42 1.39	53.8 1.6
Apr. 9.6	57.59 +.64	22.2 -1.8	26.25 +.27	35.7 +1.8	52.86 +.25	43.9 +0.9	27.74+1.22	55.6 +2.1
19.6	58.21 .58	24.2 2.1	26.50 .24	37.7 2.2	53.10 .23	44.9 1.2	28.87 1.01	57.9 2.5
29.6	58.75 .51	26.3 2.3	26.73 .20	40.0 2.5	53.32 .21	46.2 1.4	29.76 .77	60.6 2.9
May 9.5	59.23 .43	28.7 2.4	26.91 .16	42.7 2.7	53.52 .18	47.7 1.6	30.41 .51	63.6 3.1
19.5	59.62 .34	31.1 2.5	27.06 .12	45.5 2.9	53.68 .15	49.4 1.7	30.78+ .23	66.8 3.2
29.5	59.92 +.25	33.7 -2.5	27.16 +.08	48.4 +2.9	53.82 +.12	51.1 +1.8	30.87- .05	70.1 +3.3
June 8.5	60.12 .15	36.2 2.5	27.21 +.04	51.3 2.9	53.92 .09	52.9 1.8	30.67 .33	73.4 3.2
18.4	60.23 +.05	38.7 2.4	27.23 -.01	54.2 2.7	53.99 .05	54.7 1.7	30.21 .60	76.5 3.1
28.4	60.23 -.05	41.1 2.3	27.20 .05	56.8 2.5	54.02 +.01	56.3 1.6	29.48 .85	79.5 2.8
July 8.4	60.13 .14	43.3 2.1	27.12 .09	59.3 2.3	54.02 -.02	57.9 1.5	28.51 1.08	82.2 2.5
18.4	59.94 -.24	45.2 -1.8	27.01 -.13	61.4 +2.0	53.98 -.06	59.3 +1.3	27.32-1.28	84.6 +2.2
28.3	59.66 .32	46.8 1.5	26.85 .17	63.2 1.6	53.90 .09	60.5 1.1	25.94 1.46	86.6 1.8
Aug. 7.3	59.30 .39	48.1 1.1	26.66 .20	64.6 1.2	53.79 .12	61.5 0.9	24.40 1.60	88.1 1.3
17.3	58.88 .45	49.0 0.6	26.45 .22	65.6 0.8	53.66 .14	62.3 0.7	22.74 1.70	89.1 0.8
27.2	58.41 .48	49.4 -0.1	26.21 .24	66.2 +0.4	53.50 .16	62.9 0.5	20.98 1.78	89.7 +0.3
Sept. 6.2	57.91 -.50	49.3 +0.3	25.97 -.25	66.3 -0.1	53.33 -.17	63.2 +0.2	19.18-1.81	89.8 -0.2
16.2	57.41 .49	48.7 0.8	25.71 .25	66.0 0.5	53.16 .17	63.3 -0.1	17.36 1.80	89.4 0.7
26.2	56.94 .46	47.7 1.2	25.47 .23	65.3 1.0	52.99 .17	63.1 0.3	15.57 1.75	88.5 1.2
Oct. 6.1	56.50 .40	46.3 1.6	25.24 .21	64.0 1.4	52.83 .15	62.7 0.6	13.86 1.66	87.1 1.6
16.1	56.14 .32	44.4 2.0	25.05 .18	62.4 1.8	52.69 .12	62.0 0.8	12.26 1.52	85.2 2.1
26.1	55.86 -.22	42.2 +2.3	24.88 -.14	60.4 -2.2	52.59 -.09	61.0 -1.1	10.82-1.34	82.9 -2.5
Nov. 5.1	55.70 -.11	39.8 2.5	24.77 .09	57.9 2.6	52.52 -.05	59.8 1.3	9.57 1.13	80.2 2.9
15.0	55.64 +.01	37.2 2.6	24.70 -.04	55.2 2.9	52.50 .00	58.4 1.6	8.56 .88	77.1 3.2
25.0	55.72 .14	34.6 2.6	24.70 +.02	52.2 3.1	52.52 +.05	56.7 1.8	7.81 .60	73.9 3.4
Dec. 5.0	55.92 .27	32.0 2.5	24.75 .08	49.0 3.2	52.60 .10	54.8 1.9	7.36- .30	70.4 3.5
14.9	56.25 +.39	29.5 +2.3	24.86 +.14	45.7 -3.3	52.72 +.14	52.8 -2.0	7.21+ .01	66.9 -3.5
24.9	56.70 .49	27.3 2.1	25.03 .19	42.4 3.2	52.88 .19	50.7 2.1	7.38 .32	63.4 3.4
34.9	57.24 +.58	25.4 +1.8	25.25 +.24	39.3 -3.1	53.09 +.22	48.6 -2.1	7.85+ .60	60.1 -3.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Herculis.		$\epsilon$ Herculis.		$\delta$ Ophiuchi.		$\beta$ Draconis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 16 57	<sup>°</sup> <sup>'</sup> +33 42	<sup>h</sup> <sup>m</sup> 17 9	<sup>°</sup> <sup>'</sup> +14 30	<sup>h</sup> <sup>m</sup> 17 20	<sup>°</sup> <sup>'</sup> -24 4	<sup>h</sup> <sup>m</sup> 17 28	<sup>°</sup> <sup>'</sup> +52 22
(Dec. 30.9)	<sup>s</sup> 49.63 +.20	<sup>"</sup> 46.0 -3.1	<sup>s</sup> 59.33 +.20	<sup>"</sup> 15.1 -2.3	<sup>s</sup> 8.13 +.22	<sup>"</sup> 56.7 -0.1	<sup>s</sup> 6.04 +.17	<sup>"</sup> 25.7 -3.5
Jan. 9.9	49.85 .24	43.1 .28	59.55 .23	12.8 .22	8.37 .26	56.9 .02	6.25 .23	22.3 3.3
19.9	50.12 .26	40.4 .25	59.79 .26	10.7 .20	8.65 .29	57.2 .03	6.51 .29	19.2 3.0
29.8	50.41 .30	38.0 .22	60.06 .28	8.8 1.8	8.95 .31	57.5 .04	6.82 .33	16.4 2.6
Feb. 8.8	50.72 .32	36.1 1.7	60.35 .29	7.2 1.4	9.27 .33	57.9 .04	7.18 .37	14.1 2.1
18.8	51.05 +.33	34.6 -1.2	60.65 +.30	5.9 -1.1	9.60 +.33	58.3 -0.4	7.56 +.39	12.3 -1.5
28.8	51.38 .33	33.7 -0.6	60.95 .30	5.0 .07	9.93 .34	58.7 .04	7.97 .41	11.1 .08
Mar. 10.7	51.71 .33	33.4 .00	61.25 .30	4.6 -0.2	10.27 .33	59.0 .03	8.38 .41	10.6 -0.2
20.7	52.03 .31	33.6 +0.5	61.55 .29	4.6 +0.2	10.60 .33	59.3 .02	8.79 .40	10.7 +0.4
30.7	52.34 .30	34.4 1.1	61.83 .28	5.0 .06	10.93 .32	59.5 .02	9.19 .39	11.5 1.1
Apr. 9.6	52.63 +.27	35.8 +1.6	62.10 +.26	5.8 +1.0	11.24 +.30	59.6 -0.1	9.57 +.36	12.9 +1.7
19.6	52.89 .25	37.5 .20	62.36 .24	7.0 1.3	11.53 .28	59.8 -0.1	9.92 .33	14.8 .22
29.6	53.12 .22	39.7 .23	62.59 .22	8.5 1.6	11.80 .26	59.8 .00	10.23 .29	17.2 .26
May 9.6	53.32 .18	42.2 .26	62.80 .19	10.3 1.8	12.06 .24	59.8 .00	10.49 .24	20.0 .29
19.5	53.48 .14	44.8 .27	62.97 .16	12.2 .20	12.28 .21	59.8 .00	10.71 .29	23.1 3.2
29.5	53.61 +.10	47.6 +2.8	63.12 +.13	14.2 +2.0	12.48 +.18	59.9 .00	10.87 +.13	26.3 +3.3
June 8.5	53.69 .06	50.4 .28	63.24 .10	16.3 .20	12.64 .14	59.9 .00	10.97 .07	29.6 3.3
18.5	53.74 +0.2	53.2 .27	63.32 .06	18.3 .20	12.76 .10	60.0 -0.1	11.02 +0.1	33.0 3.3
28.4	53.74 -0.2	55.8 .25	63.36 +0.2	20.3 1.9	12.84 .06	60.0 .01	11.00 -0.5	36.1 3.1
July 8.4	53.70 .06	58.2 .23	63.36 -0.1	22.1 1.8	12.88 +0.2	60.1 .01	10.93 .10	39.2 .29
18.4	53.61 -1.0	60.4 +2.0	63.33 -0.5	23.8 +1.6	12.88 -0.2	60.2 -0.1	10.79 -1.6	41.9 +2.6
28.3	53.49 .14	62.3 1.7	63.26 .09	25.2 1.3	12.83 .06	60.3 -0.1	10.61 .21	44.4 .22
Aug. 7.3	53.34 .17	63.8 1.4	63.15 .12	26.5 1.1	12.75 .10	60.4 .00	10.37 .26	46.4 1.8
17.3	53.15 .20	65.0 1.0	63.02 .15	27.4 .08	12.63 .13	60.4 .00	10.09 .29	48.1 1.4
27.3	52.94 .22	65.8 .06	62.86 .17	28.2 .06	12.48 .16	60.4 +0.1	9.78 .32	49.2 .09
Sept. 6.2	52.72 -2.3	66.1 +0.1	62.69 -1.8	28.6 +0.3	12.32 -1.7	60.2 +0.1	9.44 -3.4	50.0 +0.5
16.2	52.48 .23	66.0 -0.3	62.50 .18	28.7 .00	12.14 .18	60.1 .02	9.10 .35	50.2 .00
26.2	52.26 .22	65.6 .07	62.32 .18	28.6 -0.3	11.96 .17	59.8 .03	8.74 .35	49.9 -0.5
Oct. 6.2	52.04 .20	64.6 1.1	62.15 .16	28.1 .06	11.89 .16	59.5 .03	8.40 .33	49.1 1.1
16.1	51.85 .18	63.3 1.5	62.00 .14	27.3 .09	11.64 .13	59.2 .04	8.08 .30	47.8 1.6
26.1	51.69 -1.4	61.6 -1.9	61.88 -1.0	26.3 -1.2	11.52 -1.0	58.8 +0.4	7.80 -2.6	46.0 -2.0
Nov. 5.1	51.58 .09	59.4 .23	61.79 .06	24.9 1.5	11.45 -0.5	58.4 .04	7.56 .21	43.7 .24
15.0	51.51 -0.4	57.0 .26	61.75 -0.2	23.3 1.7	11.42 .00	58.0 .03	7.38 .15	41.1 .28
25.0	51.49 +0.1	54.3 .28	61.75 +0.5	21.4 1.9	11.44 +0.5	57.7 .02	7.26 .09	38.1 3.1
Dec. 5.0	51.53 .07	51.3 3.0	61.80 .08	19.4 2.1	11.51 .10	57.5 +0.1	7.21 -0.1	34.8 3.3
15.0	51.63 +1.2	48.3 -3.1	61.90 +1.2	17.2 -2.2	11.64 +1.5	57.5 .00	7.23 +0.6	31.4 -3.5
24.9	51.77 .17	45.2 3.1	62.05 .17	14.9 2.3	11.81 .20	57.5 -0.1	7.32 .15	27.9 3.5
34.9	51.97 +2.2	42.1 -3.0	62.24 +2.0	12.6 -2.3	12.03 +2.4	57.6 -0.2	7.48 +2.2	24.4 -3.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♌ Ophiuchi.		♉ Draconia.		♊ Herculia.		♈ Draconis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 17 30	° ' " +12 37	h m 17 37	° ' " +68 47	h m 17 42	° ' " +27 46	h m 17 43	° ' " +72 11
(Dec. 30.9)	11.50 +1.18	55.8 -2.2	29.30 +1.18	68.3 -3.6	27.27 +1.15	40.7 -2.8	40.45 +1.15	46.5 -3.6
Jan. 9.9	11.70 .21	53.7 2.1	29.52 .27	64.8 3.4	27.44 .20	37.9 2.7	40.67 .28	43.0 3.4
19.9	11.92 .24	51.6 2.0	29.85 .38	61.6 3.1	27.66 .23	35.3 2.5	41.02 .41	39.7 3.1
29.9	12.18 .27	49.7 1.7	30.28 .47	58.7 2.7	27.91 .26	32.9 2.2	41.49 .52	36.8 2.7
Feb. 8.8	12.46 .28	48.1 1.4	30.79 .54	56.3 2.2	28.19 .28	30.9 1.8	42.06 .61	34.3 2.2
18.8	12.75 +.29	46.9 -1.1	31.36 +.39	54.4 -1.6	28.48 +.30	29.2 -1.4	42.71 +.68	32.3 -1.6
28.8	13.04 .30	46.0 0.7	31.97 .63	53.2 0.9	28.79 .31	28.1 0.9	43.41 .72	31.0 1.0
Mar. 10.7	13.34 .30	45.5 -0.3	32.61 .64	52.6 -0.3	29.10 .31	27.5 -0.3	44.15 .74	30.3 -0.3
20.7	13.64 .29	45.4 +0.1	33.26 .64	52.6 +0.4	29.41 .31	27.4 +0.2	44.90 .74	30.3 +0.3
30.7	13.93 .28	45.7 0.5	33.89 .61	53.4 1.1	29.72 .30	27.8 0.7	45.63 .71	31.0 1.0
Apr. 9.7	14.21 +.27	46.5 +0.9	34.48 +.56	54.8 +1.7	30.02 +.29	28.8 +1.2	46.33 +.67	32.3 +1.6
19.6	14.47 .25	47.6 1.3	35.02 .51	56.7 2.2	30.30 .27	30.2 1.6	46.96 .60	34.1 2.1
29.6	14.72 .23	49.1 1.5	35.49 .43	59.2 2.6	30.56 .25	32.1 2.0	47.52 .51	36.5 2.6
May 9.6	14.94 .21	50.7 1.7	35.88 .35	62.0 3.0	30.80 .22	34.3 2.3	47.98 .41	39.3 2.9
19.6	15.14 .18	52.6 1.9	36.19 .26	65.2 3.3	31.00 .19	36.7 2.5	48.34 .30	42.4 3.2
29.5	15.31 +.15	54.6 +2.0	36.39 +.16	68.5 +3.4	31.18 +.16	39.3 +2.6	48.58 +.18	45.7 +3.4
June 8.5	15.44 .12	56.6 2.0	36.50 +.06	72.0 3.4	31.31 .12	41.9 2.7	48.70 +.06	49.2 3.4
18.5	15.54 .08	58.6 2.0	36.51 -0.5	75.4 3.4	31.41 .08	44.6 2.7	48.70 -0.6	52.6 3.4
28.4	15.61 +0.4	60.5 1.9	36.41 .15	78.8 3.3	31.47 +0.3	47.3 2.6	48.58 .18	55.9 3.3
July 8.4	15.63 .00	62.4 1.8	36.21 .25	82.0 3.0	31.48 -0.01	49.7 2.4	48.34 .30	59.1 3.1
18.4	15.61 -0.4	64.1 +1.6	35.91 -0.34	84.9 +2.7	31.45 -0.05	52.0 +2.2	47.98 -0.40	62.1 +2.8
28.4	15.56 .07	65.5 1.4	35.53 .42	87.5 2.4	31.37 .09	54.1 1.9	47.53 .50	64.7 2.4
Aug. 7.3	15.47 .11	66.8 1.2	35.07 .49	89.7 2.0	31.26 .13	55.8 1.6	46.98 .59	67.0 2.0
17.3	15.35 .14	67.9 0.9	34.55 .55	91.5 1.6	31.12 .16	57.3 1.3	46.35 .66	68.8 1.6
27.3	15.20 .16	68.6 0.6	33.97 .60	92.8 1.1	30.94 .19	58.4 0.9	45.66 .72	70.2 1.2
Sept. 6.3	15.03 -0.17	69.2 +0.4	33.35 -0.63	93.7 +0.6	30.74 -0.21	59.1 +0.5	44.91 -0.76	71.1 +0.7
16.2	14.85 .18	69.4 +0.1	32.71 .65	94.0 +0.1	30.53 .21	59.5 +0.1	44.14 .78	71.5 +0.1
26.2	14.67 .18	69.3 -0.2	32.06 .64	93.8 -0.5	30.32 .21	59.4 -0.2	43.36 .77	71.4 -0.4
Oct. 6.2	14.49 .17	69.0 0.5	31.43 .62	93.0 1.0	30.10 .20	59.0 0.6	42.59 .75	70.7 0.9
16.1	14.34 .15	68.4 0.8	30.82 .58	91.8 1.5	29.91 .18	58.1 1.0	41.86 .71	69.5 1.4
26.1	14.20 -0.11	67.5 -1.0	30.27 -0.52	90.0 -2.0	29.74 -0.15	56.9 -1.4	41.18 -0.64	67.8 -1.9
Nov. 5.1	14.11 .08	66.3 1.3	29.78 .45	87.8 2.4	29.60 .12	55.3 1.8	40.57 .56	65.7 2.4
15.1	14.05 -0.4	64.9 1.6	29.37 .36	85.1 2.8	29.50 .07	53.3 2.1	40.06 .46	63.1 2.8
25.0	14.04 +0.01	63.2 1.8	29.06 .26	82.1 3.2	29.45 -0.02	51.0 2.4	39.65 .34	60.1 3.1
Dec. 5.0	14.07 .06	61.3 2.0	28.86 .14	78.8 3.4	29.45 +0.03	48.5 2.6	39.38 .21	56.9 3.4
15.0	14.15 +1.11	59.2 -2.1	28.78 -0.03	75.3 -3.5	29.50 +0.08	45.8 -2.8	39.23 -0.08	53.4 -3.5
25.0	14.28 .15	57.1 2.2	28.81 +0.09	71.7 3.6	29.61 .13	43.0 2.8	39.22 +0.06	49.8 3.6
35.0	14.45 +1.19	54.9 -2.2	28.96 +2.20	68.2 -3.5	29.76 +1.17	40.2 -2.8	39.36 +2.20	46.3 -3.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Draconis.		$\gamma^2$ Sagittarii.		$\mu$ Sagittarii.		$\eta$ Serpentis.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 17 54	° ' " +51 29	h m 17 59	° ' " -30 25	h m 18 7	° ' " -21 5	h m 18 16	° ' " - 2 55
Jan. 0.0	12.54 +.13	54.7 -3.4	14.94 +.19	34.9 +0.4	39.46 +.17	11.9 -0.1	1.52 +.14	34.7 -1.3
9.9	12.71 .19	51.3 3.3	15.16 .23	34.5 0.3	39.66 .21	12.0 0.2	1.68 .18	36.0 1.2
19.9	12.93 .25	48.1 3.1	15.42 .27	34.2 0.3	39.89 .24	12.2 0.2	1.88 .21	37.1 1.1
29.9	13.21 .30	45.2 2.7	15.70 .30	34.0 0.2	40.15 .27	12.4 0.2	2.11 .24	38.2 1.0
Feb. 8.9	13.53 .34	42.7 2.2	16.02 .32	33.8 0.2	40.43 .30	12.6 0.1	2.36 .26	39.2 0.9
18.8	13.89 +.37	40.7 -1.7	16.34 +.34	33.7 +0.1	40.73 +.31	12.7 -0.1	2.63 +.28	40.0 -0.7
28.8	14.28 .39	39.2 1.1	16.69 .35	33.6 0.1	41.04 .32	12.7 0.0	2.91 .29	40.5 0.4
Mar. 10.8	14.68 .40	38.5 -0.5	17.03 .35	33.5 0.1	41.36 .32	12.7 0.0	3.20 .29	40.8 -0.2
20.8	15.08 .40	38.3 +0.2	17.38 .35	33.4 0.1	41.69 .32	12.5 +0.1	3.50 .30	40.9 +0.1
30.7	15.49 .39	38.8 0.8	17.73 .35	33.4 +0.1	42.01 .32	12.2 0.2	3.79 .30	40.6 0.4
Apr. 9.7	15.87 +.38	40.0 +1.4	18.07 +.34	33.3 0.0	42.33 +.31	11.8 +0.3	4.09 +.29	40.1 +0.6
19.7	16.24 .35	41.7 2.0	18.41 .32	33.3 0.0	42.64 .30	11.5 0.4	4.37 .28	39.3 0.9
29.6	16.57 .31	41.9 2.4	18.72 .31	33.3 0.0	42.93 .29	11.0 0.4	4.65 .27	38.3 1.1
May 9.6	16.86 .27	46.5 2.8	19.02 .29	33.4 -0.1	43.21 .27	10.6 0.4	4.91 .25	37.2 1.2
19.6	17.11 .22	49.5 3.0	19.29 .26	33.5 0.1	43.47 .25	10.3 0.4	5.15 .23	35.9 1.3
29.6	17.31 +.17	52.7 +3.3	19.53 +.22	33.6 -0.2	43.70 +.22	9.9 +0.4	5.37 +.20	34.6 +1.3
June 8.5	17.45 .11	56.0 3.4	19.74 .19	33.9 0.3	43.91 .18	9.6 0.3	5.55 .17	33.2 1.3
18.5	17.54 +.06	59.4 3.3	19.91 .15	34.2 0.3	44.07 .15	9.4 0.3	5.71 .14	31.9 1.3
28.5	17.56 .00	62.7 3.2	20.04 .10	34.5 0.4	44.20 .10	9.2 0.2	5.82 .10	30.6 1.2
July 8.4	17.53 -0.06	65.9 3.1	20.12 .05	34.9 0.4	44.28 .06	9.1 0.1	5.90 .06	29.4 1.1
18.4	17.43 -0.12	68.8 +2.8	20.15 +0.1	35.3 -0.4	44.32 +0.08	9.1 +0.1	5.94 +0.02	28.3 +1.0
28.4	17.28 .18	71.5 2.5	20.14 -0.04	35.8 0.4	44.32 -0.02	9.1 0.0	5.93 -0.03	27.4 0.9
Aug. 7.4	17.08 .23	73.8 2.1	20.08 .08	36.2 0.4	44.27 .07	9.1 0.0	5.88 .07	26.5 0.8
17.3	16.83 .27	75.7 1.7	19.97 .12	36.6 0.3	44.18 .11	9.1 0.0	5.80 .10	25.9 0.6
27.3	16.54 .30	77.3 1.3	19.84 .15	36.9 0.2	44.05 .14	9.1 0.0	5.68 .13	25.4 0.5
Sept. 6.3	16.22 -0.33	78.3 +0.8	19.67 -0.18	37.0 -0.1	43.90 -0.16	9.1 0.0	5.54 -0.15	25.0 +0.3
16.3	15.88 .34	78.9 +0.3	19.48 .19	37.1 0.0	43.73 .17	9.1 0.0	5.38 .17	24.7 +0.2
26.2	15.54 .34	78.9 -0.2	19.29 .19	37.1 +0.1	43.56 .18	9.1 +0.1	5.21 .17	24.6 0.0
Oct. 6.2	15.20 .33	78.5 0.7	19.10 .18	36.8 0.3	43.38 .17	9.0 0.1	5.03 .17	24.7 -0.1
16.2	14.87 .31	77.5 1.2	18.92 .16	36.5 0.4	43.22 .15	8.9 0.1	4.87 .15	24.9 0.3
26.1	14.57 -0.28	76.1 -1.7	18.77 -0.13	36.1 +0.5	43.07 -0.13	8.7 +0.2	4.73 -0.13	25.2 -0.4
Nov. 5.1	14.32 .23	74.1 2.1	18.66 .09	35.5 0.6	42.96 .09	8.6 0.2	4.62 .10	25.7 0.6
15.1	14.11 .18	71.8 2.6	18.59 -0.04	34.9 0.6	42.89 -0.05	8.4 0.1	4.54 .06	26.4 0.7
25.1	13.96 .12	69.0 3.0	18.57 +0.01	34.3 0.6	42.87 .00	8.3 0.1	4.50 -0.02	27.2 0.9
Dec. 5.0	13.88 -0.05	65.9 3.2	18.60 .06	33.7 0.6	42.89 +0.05	8.2 +0.1	4.51 +0.03	28.1 1.0
15.0	13.86 +0.02	62.6 -3.4	18.69 +.11	33.1 +0.5	42.97 +.10	8.2 0.0	4.56 +0.07	29.2 -1.1
25.0	13.92 .09	59.2 3.4	18.83 .16	32.6 0.5	43.09 .14	8.2 -0.1	4.66 .12	30.3 1.2
35.0	14.04 +.15	55.8 -3.4	19.02 +.21	32.1 +0.5	43.25 +.18	8.3 -0.1	4.80 +0.16	31.5 -1.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Aquilæ.		$\alpha$ Lyrae. (Vega.)		$\beta$ Lyrae.		$\epsilon$ Sagittarii.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 18 29	<sup>°</sup> <sup>'</sup> — 8 18	<sup>h</sup> <sup>m</sup> 18 33	<sup>°</sup> <sup>'</sup> +38 40	<sup>h</sup> <sup>m</sup> 18 46	<sup>°</sup> <sup>'</sup> +33 14	<sup>h</sup> <sup>m</sup> 18 48	<sup>°</sup> <sup>'</sup> —26 25
Jan. 0.0	39.03 +.14	60.3 —0.8	27.97 +.09	74.5 —3.1	17.88 +.08	35.2 —2.9	56.10 +.14	28.6 +0.4
10.0	39.19 .18	61.1 0.8	28.09 .14	71.5 3.0	17.99 .13	32.4 2.8	56.26 .18	28.3 0.4
19.9	39.38 .21	61.9 0.8	28.25 .19	68.5 2.9	18.14 .17	29.6 2.7	56.46 .22	27.9 0.4
29.9	39.61 .24	62.7 0.7	28.46 .23	65.7 2.6	18.33 .21	26.9 2.5	56.69 .25	27.6 0.4
Feb. 8.9	39.85 .26	63.4 0.6	28.71 .26	63.2 2.3	18.56 .24	24.6 2.2	56.95 .27	27.2 0.4
18.8	40.12 +.27	63.9 —0.4	28.99 +.29	61.2 —1.8	18.82 +.27	22.6 —1.8	57.23 +.29	26.8 +0.4
28.8	40.40 .29	64.2 —0.2	29.30 .32	59.6 1.3	19.10 .29	21.0 1.3	57.54 .31	26.4 0.4
Mar. 10.8	40.69 .30	64.3 0.0	29.62 .33	58.6 0.7	19.40 .31	20.0 0.7	57.86 .32	26.0 0.5
20.8	40.99 .30	64.2 +0.2	29.96 .34	58.2 —0.1	19.72 .32	19.6 —0.2	58.18 .33	25.5 0.5
30.7	41.30 .30	63.9 0.4	30.30 .34	58.3 +0.5	20.04 .32	19.7 +0.4	58.52 .34	25.0 0.5
Apr. 9.7	41.60 +.30	63.4 +0.6	30.64 +.33	59.1 +1.0	20.37 +.32	20.3 +0.9	58.85 +.34	24.5 +0.5
19.7	41.89 .29	62.7 0.8	30.97 .32	60.4 1.6	20.69 .31	21.5 1.4	59.19 .33	23.9 0.5
29.7	42.18 .28	61.8 0.9	31.28 .30	62.3 2.0	21.00 .30	23.2 1.9	59.51 .32	23.4 0.5
May 9.6	42.45 .26	60.8 1.0	31.58 .28	64.5 2.4	21.29 .28	25.3 2.3	59.83 .31	22.9 0.5
19.6	42.71 .24	59.7 1.1	31.84 .25	67.1 2.7	21.56 .25	27.8 2.6	60.13 .29	22.5 0.4
29.6	42.94 +.22	58.6 +1.1	32.07 +.21	70.0 +3.0	21.79 +.22	30.5 +2.8	60.40 +.26	22.1 +0.5
June 8.5	43.15 .19	57.5 1.1	32.26 .17	73.1 3.1	22.00 .18	33.4 2.9	60.65 .23	21.8 0.2
18.5	43.32 .15	56.4 1.1	32.41 .12	76.2 3.2	22.16 .14	36.4 3.0	60.86 .19	21.7 +0.1
28.5	43.45 .11	55.3 1.0	32.51 .07	79.4 3.1	22.28 .09	39.4 3.0	61.03 .15	21.6 0.0
July 8.5	43.55 .07	54.4 0.9	32.56 +.02	82.5 3.0	22.35 +.05	42.4 2.9	61.16 .10	21.7 —0.1
18.4	43.60 +.03	53.5 +0.8	32.56 —.03	85.4 +2.8	22.37 .00	45.2 +2.7	61.24 +.05	21.8 —0.2
28.4	43.61 —.01	52.8 0.7	32.50 .08	88.1 2.6	22.34 —.05	47.8 2.5	61.27 +.01	22.1 0.3
Aug. 7.4	43.58 .05	52.2 0.5	32.40 .12	90.6 2.3	22.27 .09	50.2 2.2	61.26 —.04	22.4 0.3
17.4	43.50 .09	51.7 0.4	32.26 .16	92.7 2.0	22.16 .13	52.3 1.9	61.20 .08	22.7 0.3
27.3	43.40 .12	51.4 0.3	32.07 .20	94.5 1.6	22.00 .17	54.1 1.6	61.09 .12	23.0 0.3
Sept. 6.3	43.26 —.15	51.1 +0.2	31.86 —.23	95.9 +1.2	21.81 —.20	55.5 +1.2	60.96 —.15	23.3 —0.3
16.3	43.11 .16	50.9 +0.1	31.62 .25	96.9 0.7	21.60 .22	56.5 0.8	60.79 .17	23.5 0.2
26.2	42.94 .17	50.9 0.0	31.37 .23	97.4 +0.3	21.38 .23	57.1 +0.4	60.61 .18	23.7 —0.1
Oct. 6.2	42.77 .17	50.9 —0.1	31.11 .23	97.4 —0.2	21.14 .23	57.2 —0.1	60.43 .18	23.8 0.0
16.2	42.60 .15	51.0 0.2	30.86 .24	97.0 0.7	20.92 .22	56.9 0.5	60.25 .17	23.8 +0.1
26.2	42.46 —.13	51.2 —0.3	30.63 —.22	96.1 —1.1	20.70 —.20	56.2 —0.9	60.08 —.15	23.7 +0.2
Nov. 5.1	42.34 .10	51.5 0.3	30.42 .19	94.8 1.5	20.51 .17	55.1 1.4	59.94 .12	23.5 0.2
15.1	42.26 .06	51.9 0.4	30.25 .15	93.0 2.0	20.36 .14	53.5 1.8	59.84 .08	23.2 0.3
25.1	42.21 —.02	52.4 0.6	30.13 .10	90.8 2.3	20.24 .10	51.6 2.1	59.78 —.04	22.9 0.3
Dec. 5.1	42.21 +0.2	53.0 0.7	30.05 —.05	88.3 2.6	20.17 —.05	49.3 2.4	59.76 +0.1	22.5 0.4
15.0	42.25 +.07	53.7 —0.7	30.03 .00	85.6 —2.9	20.14 .00	46.8 —2.6	59.79 +.06	22.1 +0.4
25.0	42.34 .11	54.5 0.8	30.06 +.06	82.6 3.0	20.17 +.05	44.0 2.8	59.87 .10	21.7 0.4
35.0	42.47 +.15	55.3 —0.8	30.14 +.11	79.5 —3.1	20.24 +.10	41.2 —2.9	60.00 +.15	21.3 +0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	50 Draconis.		σ Octantis.		ζ Aquilæ.		δ Sagittarii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> 18 <sup>m</sup> 49	<sup>°</sup> +75 <sup>'</sup> 18	<sup>h</sup> 18	<sup>°</sup> -89 <sup>'</sup> 15	<sup>h</sup> 19 <sup>m</sup> 0	<sup>°</sup> +13 <sup>'</sup> 42	<sup>h</sup> 19 <sup>m</sup> 11	<sup>°</sup> -19 <sup>'</sup> 7
Jan. 0.0	33.62 -10	47.5 -3.4	55 12.5+ 3.3	30.9+3.5	42.77 +0.9	39.4 -2.0	39.71 +10	68.0 0.0
10.0	33.61 +.08	44.1 3.4	55 17.3 6.3	27.4 3.4	42.88 .13	37.4 2.0	39.84 .15	68.0 0.0
20.0	33.78 .24	40.6 3.3	55 25.1 9.3	24.1 3.3	43.02 .16	35.4 1.9	40.01 .18	68.0 0.0
29.9	34.10 .40	37.4 3.1	55 35.7 12.0	20.9 3.0	43.20 .19	33.6 1.7	40.20 .21	68.0 +0.1
Feb. 8.9	34.57 .54	34.4 2.8	55 48.9 14.3	18.0 2.7	43.41 .22	32.0 1.5	40.43 .24	67.9 0.1
18.9	35.17 +.66	31.9 -2.3	56 4.2+16.2	15.5 +2.3	43.64 +.24	30.7 -1.2	40.68 +.26	67.7 +0.1
28.8	35.89 .76	29.8 1.8	56 21.2 17.7	13.3 1.9	43.90 .26	29.6 0.8	40.95 .28	67.4 0.3
Mar. 10.8	36.69 .83	28.4 1.2	56 39.5 18.8	11.6 1.5	44.17 .28	29.0 -0.4	41.24 .30	67.0 0.4
20.8	37.55 .87	27.5 -0.5	56 58.7 19.5	10.4 1.0	44.46 .29	28.8 0.0	41.54 .31	66.5 0.6
30.8	38.43 .88	27.3 +0.1	57 18.4 19.7	9.6 +0.5	44.75 .30	29.0 +0.4	41.85 .32	65.9 0.7
Apr. 9.7	39.31 +.87	27.8 +0.8	57 38.1+19.6	9.4 0.0	45.05 +.30	29.6 +0.8	42.17 +.32	65.2 +0.8
19.7	40.17 .82	28.9 1.4	57 57.4 19.0	9.6 -0.5	45.35 .29	30.6 1.2	42.49 .32	64.4 0.8
29.7	40.96 .75	30.6 2.0	58 16.0 18.1	10.3 0.9	45.64 .28	32.0 1.5	42.81 .31	63.5 0.9
May 9.7	41.67 .66	32.8 2.5	58 33.5 16.8	11.5 1.4	45.92 .27	33.7 1.8	43.12 .30	62.7 0.9
19.6	42.28 .55	35.5 2.9	58 49.5 15.1	13.1 1.8	46.18 .25	35.7 2.0	43.41 .28	61.8 0.9
29.6	42.77 +.42	38.6 +3.2	59 3.7+13.1	15.0 -2.1	46.42 +.23	37.8 +2.2	43.69 +.26	60.9 +0.8
June 8.6	43.13 .29	41.8 3.4	59 15.7 10.8	17.3 2.4	46.64 .20	40.0 2.3	43.94 .24	60.1 0.7
18.5	43.35 +.14	45.3 3.5	59 25.3 8.3	19.8 2.7	46.82 .16	42.3 2.3	44.16 .20	59.5 0.6
28.5	43.42 -0.1	48.8 3.5	59 32.2 5.5	22.6 2.8	46.97 .12	44.6 2.2	44.34 .16	58.9 0.5
July 8.5	43.34 .15	52.3 3.4	59 36.3+ 2.6	25.5 2.9	47.07 .08	46.8 2.1	44.49 .12	58.5 0.4
18.5	43.11 -0.30	55.7 +3.3	59 37.4 -0.4	28.5 -2.9	47.13 +.04	48.9 +2.0	44.58 +.07	58.1 +0.3
28.4	42.74 .43	59.0 3.1	59 35.6 3.3	31.4 2.8	47.15 .00	50.8 1.8	44.63 +.03	57.9 0.2
Aug. 7.4	42.25 .56	62.0 2.8	59 30.8 6.2	34.2 2.6	47.13 -0.4	52.6 1.6	44.64 -0.02	57.8 +0.1
17.4	41.63 .67	64.6 2.5	59 23.1 8.9	36.7 2.4	47.06 .08	54.1 1.4	44.60 .06	57.8 0.0
27.4	40.91 .77	66.9 2.1	59 13.0 11.3	38.9 2.0	46.96 .12	55.3 1.2	44.52 .10	57.9 -0.1
Sept. 6.3	40.10 -0.24	68.8 +1.7	59 0.6-13.5	40.7 -1.6	46.82 -0.15	56.3 +0.9	44.40 -0.13	58.0 -0.1
16.3	39.22 .90	70.3 1.8	58 46.4 14.8	42.0 1.0	46.66 .17	57.0 0.6	44.26 .15	58.2 0.1
26.3	38.30 .93	71.2 0.7	58 31.0 13.8	42.8 -0.5	46.49 .18	57.5 +0.3	44.09 .17	58.3 0.2
Oct. 6.2	37.35 .95	71.6 +0.2	58 15.0 12.1	42.9 +0.1	46.31 .18	57.6 0.0	43.92 .17	58.5 0.1
16.2	36.40 .93	71.5 -0.4	57 58.9 15.8	42.5 0.7	46.13 .17	57.4 -0.3	43.74 .17	58.6 0.1
26.2	35.49 -0.89	70.9 -0.9	57 43.4-14.8	41.5 +1.3	45.96 -0.16	57.0 -0.6	43.58 -0.15	58.7 -0.1
Nov. 5.2	34.62 .83	69.7 1.4	57 29.2 13.3	39.8 1.9	45.81 .13	56.2 0.9	43.44 .12	58.7 -0.1
15.1	33.83 .74	68.0 1.9	57 16.9 11.2	37.6 2.4	45.69 .10	55.2 1.2	43.33 .09	58.8 0.0
25.1	33.14 .63	65.8 2.4	57 6.9 8.6	35.0 2.8	45.61 .06	53.9 1.4	43.26 .05	58.9 0.0
Dec. 5.1	32.58 .50	63.2 2.8	56 59.8 5.6	32.0 3.1	45.56 -0.02	52.3 1.6	43.22 -0.01	58.8 0.0
15.1	32.15 -0.35	60.2 -3.1	56 55.7- 2.4	28.7 +3.4	45.56 +0.02	50.6 -1.8	43.23 +0.03	58.8 0.0
25.0	31.88 .19	57.0 3.3	56 54.9+ 0.8	25.3 3.5	45.60 .06	48.7 1.9	43.29 .08	58.9 0.0
35.0	31.77 -0.03	53.6 -3.4	56 57.4+ 3.7	21.8 +3.5	45.68 +0.10	46.8 -2.0	43.38 +0.12	58.9 0.0



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Draconis.		$\gamma$ Draconis.		$\delta$ Aquilæ.		$\epsilon$ Aquilæ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	<sup>h</sup> <sup>m</sup> 19 12	<sup>°</sup> <sup>'</sup> +67 28	<sup>h</sup> <sup>m</sup> 19 17	<sup>°</sup> <sup>'</sup> +73 9	<sup>h</sup> <sup>m</sup> 19 20	<sup>°</sup> <sup>'</sup> + 2 54	<sup>h</sup> <sup>m</sup> 19 31	<sup>°</sup> <sup>'</sup> - 7 15
Jan. 0.0	28.27 -07	56.1 -3.4	25.82 -15	59.4 -3.3	20.92 +08	38.1 -1.3	23.92 +08	18.3 -0.7
10.0	28.26 +04	52.7 3.4	25.74 -01	56.0 3.4	21.02 .12	36.8 1.3	24.01 .11	19.0 0.7
20.0	28.35 .15	49.3 3.4	25.81 +14	52.6 3.4	21.16 .15	35.5 1.2	24.14 .15	19.6 0.6
29.9	28.55 .25	45.9 3.8	26.02 .08	49.2 3.2	21.32 .18	34.3 1.1	24.31 .18	20.2 0.5
Feb. 8.9	28.85 .34	42.9 2.9	26.37 .41	46.1 2.9	21.52 .21	33.2 0.9	24.50 .21	20.7 0.4
18.9	29.24 +43	40.2 -2.5	26.83 +38	43.4 -2.5	21.74 +23	32.4 -0.7	24.72 +23	21.0 -0.8
28.9	29.70 .30	37.9 2.0	27.41 .62	41.1 2.0	21.98 .25	31.8 0.4	24.96 .25	21.2 0.0
Mar. 10.8	30.23 .55	36.2 1.4	28.07 .70	39.3 1.5	22.25 .27	31.5 -0.1	25.22 .27	21.1 +0.2
20.8	30.80 .59	35.1 0.8	28.80 .75	38.1 0.9	22.52 .28	31.5 +0.2	25.50 .28	20.8 0.4
30.8	31.41 .61	34.7 -0.1	29.57 .78	37.6 -0.2	22.81 .29	31.9 0.5	25.79 .29	20.3 0.6
Apr. 9.8	32.02 +61	35.0 +0.6	30.36 +78	37.7 +0.5	23.11 +30	32.5 +0.8	26.09 +30	19.5 +0.9
19.7	32.62 .59	35.8 1.2	31.14 .76	38.5 1.1	23.41 .30	33.5 1.1	26.40 .30	18.5 1.1
29.7	33.20 .56	37.3 1.8	31.88 .72	39.9 1.7	23.70 .29	34.7 1.4	26.70 .30	17.4 1.2
May 9.7	33.74 .51	39.4 2.3	32.57 .65	41.8 2.2	23.99 .28	36.2 1.6	27.00 .29	16.1 1.3
19.6	34.22 .45	41.9 2.7	33.18 .56	44.3 2.7	24.27 .27	37.8 1.7	27.29 .28	14.7 1.4
29.6	34.63 +37	44.9 +3.1	33.69 +46	47.2 +3.0	24.53 +23	39.6 +1.8	27.56 +26	13.3 +1.4
June 8.6	34.97 .29	48.1 3.3	34.11 .35	50.3 3.3	24.76 .22	41.5 1.8	27.81 .24	11.9 1.4
18.6	35.21 .19	51.6 3.5	34.40 .23	53.7 3.5	24.97 .19	43.3 1.8	28.03 .20	10.5 1.3
28.5	35.35 +10	55.1 3.6	34.56 +10	57.3 3.6	25.14 .15	45.1 1.8	28.22 .17	9.2 1.2
July 8.5	35.40 .00	58.7 3.6	34.60 -03	60.9 3.6	25.27 .11	46.8 1.7	28.37 .13	8.0 1.1
18.5	35.35 -10	62.3 +3.5	34.51 -16	64.4 +3.5	25.36 +07	48.4 +1.5	28.47 +09	6.9 +1.0
28.5	35.20 .20	65.7 3.3	34.29 .28	67.9 3.3	25.41 +02	49.9 1.4	28.54 +04	6.0 0.8
Aug. 7.4	34.95 .29	68.9 3.0	33.94 .40	71.1 3.1	25.41 -02	51.2 1.2	28.55 .00	5.2 0.7
17.4	34.62 .37	71.8 2.7	33.49 .51	74.1 2.8	25.37 .06	52.3 1.0	28.53 -04	4.6 0.5
27.4	34.21 .44	74.4 2.4	32.93 .60	76.7 2.5	25.29 .10	53.2 0.8	28.46 .08	4.2 0.4
Sept. 6.3	33.74 -30	76.5 +2.0	32.29 -68	79.0 +2.1	25.18 -13	53.9 +0.6	28.36 -12	3.8 +0.3
16.3	33.21 .55	78.3 1.5	31.57 .74	80.8 1.6	25.04 .15	54.4 0.4	28.23 .14	3.7 +0.1
26.3	32.64 .58	79.5 1.0	30.81 .78	82.2 1.1	24.88 .16	54.7 +0.2	28.08 .16	3.6 0.0
Oct. 6.3	32.05 .59	80.3 +0.5	30.00 .81	83.1 0.6	24.71 .17	54.8 0.0	27.92 .16	3.6 -0.1
16.2	31.45 .59	80.5 -0.1	29.19 .81	83.4 +0.1	24.55 .16	54.7 -0.2	27.75 .16	3.8 0.2
26.2	30.86 -37	80.2 -0.6	28.39 -79	83.2 -0.5	24.39 -15	54.4 -0.4	27.59 -15	4.0 -0.3
Nov. 5.2	30.31 .53	79.2 1.2	27.62 .74	82.4 1.0	24.25 .13	53.9 0.6	27.45 .13	4.3 0.4
15.2	29.80 .48	77.8 1.7	26.91 .68	81.1 1.6	24.13 .10	53.2 0.7	27.34 .10	4.7 0.4
25.1	29.35 .41	75.9 2.2	26.27 .59	79.3 2.1	24.05 .07	52.3 0.9	27.25 .07	5.2 0.5
Dec. 5.1	28.98 .33	73.4 2.6	25.72 .49	76.9 2.5	24.00 -03	51.3 1.1	27.20 -03	5.8 0.6
15.1	28.69 -23	70.6 -3.0	25.29 -37	74.2 -2.9	23.99 +01	50.2 -1.2	27.19 +01	6.4 -0.6
25.0	28.51 .13	67.5 3.2	24.99 .23	71.1 3.2	24.02 .05	48.9 1.3	27.22 .05	7.1 0.7
35.0	28.43 -03	64.2 -3.4	24.83 -10	67.9 -3.4	24.09 +09	47.6 -1.3	27.29 +09	7.8 -0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\gamma$ Aquilæ.		$\alpha$ Aquilæ. (Altair.)		$\epsilon$ Draconis.		$\beta$ Aquilæ.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 19 41	° ' " +10 21	h m 19 45	° ' " + 8 35	h m 19 48	° ' " +70 0	h m 19 50	° ' " + 6 8
Jan. 0.0	24.16 +.05	51.3 -1.7	47.97 +.05	54.5 -1.5	26.84 -1.19	34.1 -3.2	17.78 +.05	65.4 -1.4
10.0	24.24 .09	49.7 1.7	48.04 .09	52.9 1.6	26.71 -0.07	30.8 3.3	17.85 .09	64.0 1.4
20.0	24.34 .13	48.0 1.6	48.15 .12	51.4 1.5	26.70 +.05	27.5 3.4	17.95 .13	62.5 1.4
30.0	24.49 .16	46.5 1.5	48.29 .15	49.9 1.4	26.81 .17	24.1 3.3	18.09 .15	61.2 1.3
Feb. 8.9	24.66 .19	45.0 1.3	48.46 .18	48.6 1.2	27.04 .28	20.9 3.1	18.25 .18	60.0 1.1
18.9	24.86 +.22	43.8 -1.0	48.66 +.21	47.5 -1.0	27.38 +.39	18.0 -2.8	18.45 +.21	59.0 -0.9
28.9	25.09 .24	42.9 0.7	48.88 .24	46.7 0.7	27.82 .48	15.4 2.3	18.67 .23	58.3 0.6
Mar. 10.9	25.34 .26	42.4 -0.4	49.13 .26	46.2 -0.3	28.35 .56	13.3 1.8	18.91 .25	57.9 -0.2
20.8	25.60 .27	42.2 0.0	49.40 .27	46.1 +0.1	28.94 .62	11.8 1.2	19.17 .27	57.8 +0.1
30.8	25.89 .29	42.4 +0.4	49.68 .29	46.4 0.4	29.58 .66	10.9 -0.6	19.45 .28	58.1 0.4
Apr. 9.8	26.18 +.30	43.0 +0.8	49.97 +.30	47.0 +0.8	30.25 +.68	10.7 +0.1	19.74 +.29	58.7 +0.8
19.7	26.48 .30	44.0 1.1	50.27 .30	48.0 1.1	30.93 .67	11.1 0.7	20.04 .30	59.7 1.1
29.7	26.78 .30	45.3 1.4	50.57 .30	49.3 1.4	31.60 .65	12.2 1.3	20.34 .30	60.9 1.4
May 9.7	27.07 .29	46.9 1.7	50.87 .29	50.8 1.7	32.24 .61	13.8 1.9	20.64 .29	62.5 1.6
19.7	27.36 .28	48.7 1.9	51.16 .28	52.7 1.9	32.83 .56	16.0 2.4	20.93 .28	64.2 1.8
29.6	27.63 +.26	50.7 +2.1	51.43 +.26	54.7 +2.0	33.35 +.48	18.6 +2.8	21.20 +.26	66.1 +1.9
June 8.6	27.87 .23	52.9 2.2	51.68 .24	56.8 2.1	33.79 .39	21.6 3.2	21.45 .24	68.1 2.0
18.6	28.09 .23	55.1 2.2	51.91 .22	58.9 2.2	34.14 .30	24.9 3.4	21.68 .21	70.1 2.0
28.6	28.27 .16	57.3 2.2	52.09 .17	61.1 2.1	34.38 .19	28.5 3.6	21.88 .18	72.2 2.0
July 8.5	28.42 .12	59.5 2.1	52.24 .13	63.1 2.0	34.52 +.08	32.1 3.6	22.03 .14	74.1 1.9
18.5	28.52 +.08	61.5 +2.0	52.35 +.09	65.1 +1.9	34.55 -0.03	35.7 +3.6	22.15 +.09	76.0 +1.8
28.5	28.58 +.04	63.4 1.8	52.42 +.04	67.0 1.7	34.47 .13	39.3 3.5	22.22 +.05	77.7 1.6
Aug. 7.4	28.60 -0.01	65.1 1.6	52.44 .00	68.6 1.6	34.28 .24	42.8 3.3	22.24 .00	79.2 1.4
17.4	28.57 .05	66.7 1.4	52.42 -0.04	70.1 1.4	33.99 .34	46.0 3.1	22.22 -0.04	80.5 1.2
27.4	28.50 .09	68.0 1.2	52.35 .08	71.3 1.1	33.60 .43	49.0 2.8	22.18 .08	81.6 1.0
Sept. 6.4	28.40 -1.12	69.0 +0.9	52.26 -1.11	72.3 +0.9	33.13 -0.50	51.6 +2.4	22.07 -1.11	82.5 +0.8
16.3	28.26 .16	69.8 0.7	52.13 .14	73.1 0.6	32.59 .57	53.9 2.0	21.95 .16	83.2 0.5
26.3	28.11 .14	70.3 0.4	51.98 .16	73.6 0.4	32.00 .62	55.7 1.5	21.80 .14	83.6 0.3
Oct. 6.3	27.94 .17	70.6 +0.1	51.81 .17	73.9 +0.1	31.36 .65	57.0 1.0	21.64 .16	83.8 +0.1
16.3	27.76 .17	70.6 -0.1	51.64 .17	73.9 -0.1	30.70 .66	57.8 +0.5	21.47 .16	83.8 -0.1
26.2	27.60 -1.16	70.4 -0.4	51.48 -1.16	73.7 -0.3	30.04 -0.65	58.0 0.0	21.31 -1.16	83.6 -0.4
Nov. 5.2	27.44 .12	69.8 0.6	51.33 .14	73.2 0.6	29.40 .63	57.7 -0.6	21.16 .12	83.1 0.6
15.2	27.32 .14	69.1 0.9	51.20 .12	72.5 0.8	28.78 .59	56.8 1.2	21.03 .14	82.4 0.8
25.2	27.21 .09	68.1 1.1	51.10 .09	71.6 1.0	28.22 .52	55.3 1.7	20.93 .09	81.6 1.0
Dec. 5.1	27.14 .05	66.9 1.3	51.03 .05	70.4 1.2	27.74 .45	53.4 2.2	20.86 .05	80.5 1.1
15.1	27.11 -0.01	65.4 -1.5	50.99 -0.01	69.1 -1.4	27.33 -0.36	50.9 -2.6	20.82 -0.01	79.3 -1.3
25.1	27.12 +0.03	63.9 1.6	51.00 +0.02	67.7 1.5	27.02 .25	48.1 3.0	20.83 +0.02	78.0 1.4
35.0	27.16 +0.06	62.2 -1.7	51.04 +0.06	66.1 -1.6	26.83 -1.14	45.0 -3.2	20.87 +0.06	76.5 -1.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♈ Aquilæ.		♄ Cephei.		♑ Capricorni.		♏ Pavonia.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination South.
	h m 19 59	° ' " + 6 59	h m 20 12	° ' " + 77 23	h m 20 12	° ' " - 12 51	h m 20 17	° ' " - 57 3
Jan. 0.1	9.10 +.04	23.1 -1.4	12.57 - .45	83.3 -2.9	23.52 +.04	42.7 -0.3	34.67 +.02	49.8 +2.8
10.0	9.16 .08	21.8 1.4	12.21 .87	80.2 3.1	23.59 .08	43.0 0.2	34.72 .09	47.5 2.4
20.0	9.25 .11	20.3 1.4	12.03 - .08	77.0 3.3	23.68 .11	43.2 0.2	34.84 .15	45.1 2.5
30.0	9.38 .14	19.0 1.3	12.05 + .11	73.6 3.3	23.81 .14	43.3 -0.1	35.03 .22	42.6 2.5
Feb. 9.0	9.54 .17	17.7 1.1	12.25 .29	70.4 3.2	23.97 .17	43.3 +0.1	35.28 .28	40.1 2.5
18.9	9.73 +.20	16.7 -0.9	12.64 + .47	67.3 -2.9	24.16 +.20	43.2 +0.2	35.58 +.33	37.6 +2.4
28.9	9.94 .22	16.0 0.6	13.19 .63	64.6 2.5	24.37 .23	42.9 0.4	35.93 .37	35.3 2.3
Mar. 10.9	10.18 .25	15.5 -0.3	13.90 .77	62.2 2.1	24.61 .25	42.4 0.5	36.33 .42	33.0 2.1
20.8	10.43 .27	15.4 +0.1	14.74 .88	60.4 1.5	24.87 .27	41.8 0.7	36.76 .45	31.0 1.9
30.8	10.71 .28	15.7 0.5	15.67 .96	59.2 0.9	25.15 .29	41.0 0.9	37.23 .48	29.2 1.7
Apr. 9.8	11.00 +.29	16.3 +0.8	16.66 +1.01	58.5 -0.3	25.44 +.30	40.0 +1.1	37.72 +.50	27.6 +1.4
19.8	11.29 .30	17.3 1.1	17.69 1.02	58.5 +0.3	25.75 .31	38.9 1.2	38.23 .51	26.3 1.2
29.7	11.60 .30	18.6 1.4	18.71 1.00	59.2 1.0	26.06 .31	37.6 1.3	38.75 .52	25.3 0.8
May 9.7	11.90 .30	20.1 1.7	19.69 .95	60.5 1.6	26.38 .31	36.2 1.4	39.27 .52	24.6 0.5
19.7	12.19 .29	21.9 1.9	20.61 .87	62.3 2.1	26.69 .30	34.8 1.4	39.78 .50	24.3 +0.2
29.7	12.47 +.27	23.8 +2.0	21.43 + .76	64.6 +2.5	26.99 +.29	33.5 +1.4	40.28 +.48	24.3 -0.2
June 8.6	12.73 .25	25.9 2.1	22.14 .64	67.4 2.9	27.27 .27	32.1 1.3	40.74 .44	24.7 0.5
18.6	12.96 .22	28.0 2.1	22.71 .49	70.5 3.2	27.52 .24	30.8 1.2	41.16 .39	25.4 0.8
28.6	13.16 .18	30.1 2.1	23.13 .33	73.9 3.4	27.75 .21	29.6 1.1	41.52 .34	26.4 1.2
July 8.5	13.32 .14	32.1 2.0	23.38 + .17	77.4 3.6	27.94 .17	28.6 0.9	41.83 .27	27.8 1.5
18.5	13.45 +.10	34.0 +1.8	23.47 .00	81.0 +3.6	28.09 +.13	27.8 +0.8	42.07 +.20	29.3 -1.7
28.5	13.52 .06	35.8 1.7	23.39 - .17	84.7 3.6	28.19 .08	27.1 0.6	42.23 .12	31.1 1.8
Aug. 7.5	13.56 +.01	37.4 1.5	23.14 .33	88.3 3.5	28.25 +.04	26.5 0.4	42.31 +.04	33.0 1.9
17.4	13.55 - .03	38.8 1.3	22.73 .48	91.7 3.3	28.27 - .01	26.2 0.3	42.32 - .04	34.9 1.9
27.4	13.50 .07	40.0 1.1	22.17 .62	94.9 3.1	28.23 .05	26.0 +0.1	42.24 .11	36.9 1.9
Sept. 6.4	13.41 - .10	41.0 +0.9	21.48 - .75	97.8 +2.8	28.16 - .09	25.9 0.0	42.10 - .12	38.7 -1.7
16.4	13.29 .13	41.7 0.6	20.67 .86	100.4 2.4	28.06 .12	25.9 -0.1	41.89 .23	40.3 1.5
26.3	13.15 .15	42.2 0.4	19.76 .95	102.6 1.9	27.92 .14	26.1 0.2	41.63 .28	41.7 1.2
Oct. 6.3	12.99 .16	42.5 +0.2	18.78 1.01	104.3 1.5	27.77 .15	26.3 0.2	41.33 .31	42.8 0.9
16.3	12.82 .16	42.5 -0.1	17.74 1.05	105.5 1.0	27.61 .16	26.5 0.3	41.01 .32	43.5 0.5
26.2	12.66 - .16	42.3 -0.3	16.68 -1.06	106.2 +0.4	27.45 - .15	26.8 -0.3	40.69 - .32	43.8 -0.1
Nov. 5.2	12.51 .14	41.9 0.5	15.62 1.04	106.4 -0.1	27.30 .14	27.1 0.3	40.38 .30	43.7 +0.3
15.2	12.37 .12	41.2 0.7	14.59 1.00	106.0 0.7	27.17 .12	27.4 0.3	40.09 .26	43.1 0.8
25.2	12.27 .09	40.4 0.9	13.62 .92	105.0 1.3	27.06 .09	27.8 0.3	39.85 .22	42.1 1.2
Dec. 5.1	12.19 .06	39.3 1.1	12.74 .82	103.4 1.8	26.99 .06	28.1 0.3	39.66 .16	40.8 1.6
15.1	12.15 - .02	38.2 -1.3	11.98 - .70	101.3 -2.3	26.95 - .02	28.4 -0.3	39.53 - .20	39.1 +1.9
25.1	12.14 +.01	36.8 1.4	11.35 .55	98.8 2.7	26.94 +.01	28.7 0.3	39.46 - .03	37.1 2.1
35.1	12.18 +.05	35.4 -1.4	10.88 - .39	95.9 -3.0	26.97 +.05	29.0 -0.3	39.47 +.04	34.9 +2.3

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	γ Cygni.		π Capricorni.		ε Delphini.		Groombridge 3241.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 20 18	<sup>°</sup> <sup>'</sup> +39 55	<sup>h</sup> <sup>m</sup> 20 21	<sup>°</sup> <sup>'</sup> -18 32	<sup>h</sup> <sup>m</sup> 20 28	<sup>°</sup> <sup>'</sup> +10 57	<sup>h</sup> <sup>m</sup> 20 30	<sup>°</sup> <sup>'</sup> +72 10
Jan. 0.1	33.11 -03	53.0 -2.6	28.85 +03	49.9 +0.1	20.06 +02	24.9 -1.5	22.40 -33	79.5 -2.8
10.0	33.10 +01	50.2 2.8	28.91 .07	49.8 0.1	20.09 .04	23.4 1.5	22.13 .21	76.6 3.1
20.0	33.14 .06	47.4 2.8	28.99 .11	49.6 0.2	20.15 .08	21.8 1.5	21.99 -08	73.4 3.3
30.0	33.22 .11	44.6 2.8	29.12 .14	49.4 0.3	20.24 .11	20.3 1.4	21.97 +05	70.0 3.3
Feb. 9.0	33.35 .15	41.9 2.6	29.27 .17	49.0 0.4	20.37 .14	19.0 1.3	22.09 .18	66.8 3.2
18.9	33.52 +19	39.5 -2.3	29.46 +20	48.5 +0.5	20.53 +17	17.8 -1.1	22.34 +31	63.6 -3.0
28.9	33.74 .23	37.3 1.9	29.67 .23	47.9 0.7	20.72 .20	16.9 0.8	22.72 .43	60.8 2.7
Mar. 10.9	33.99 .27	35.6 1.5	29.91 .25	47.2 0.8	20.94 .23	16.3 0.4	23.20 .53	58.3 2.2
20.9	34.28 .30	34.4 0.9	30.17 .27	46.3 0.9	21.18 .25	16.0 -0.1	23.78 .62	56.4 1.7
30.8	34.59 .32	33.8 -0.4	30.45 .29	45.3 1.1	21.44 .27	16.1 +0.3	24.44 .69	55.0 1.1
Apr. 9.8	34.93 +34	33.7 +0.2	30.75 +31	44.1 +1.2	21.72 +29	16.6 +0.7	25.15 +73	54.2 -0.5
19.8	35.27 .35	34.1 0.8	31.07 .32	42.9 1.3	22.01 .30	17.5 1.1	25.90 .75	54.0 +0.2
29.7	35.63 .35	35.2 1.3	31.39 .32	41.6 1.3	22.31 .31	18.8 1.4	26.66 .75	54.5 0.8
May 9.7	35.98 .35	36.8 1.8	31.71 .32	40.3 1.3	22.62 .30	20.3 1.7	27.40 .73	55.6 1.4
19.7	36.33 .35	38.8 2.2	32.03 .32	38.9 1.3	22.92 .30	22.2 1.9	28.11 .68	57.3 1.9
29.7	36.65 +31	41.2 +2.6	32.34 +30	37.7 +1.2	23.22 +29	24.2 +2.1	28.76 +61	59.6 +2.4
June 8.6	36.95 .28	44.0 2.9	32.64 .28	36.5 1.1	23.49 .27	26.4 2.2	29.34 .53	62.2 2.9
18.6	37.21 .24	47.0 3.1	32.91 .26	35.4 1.0	23.75 .24	28.7 2.3	29.83 .44	65.3 3.2
28.6	37.43 .20	50.2 3.2	33.15 .22	34.5 0.8	23.97 .20	31.0 2.3	30.21 .33	68.6 3.4
July 8.6	37.61 .15	53.5 3.3	33.35 .18	33.8 0.7	24.16 .17	33.2 2.2	30.48 .21	72.2 3.6
18.5	37.73 +10	56.8 +3.3	33.51 +14	33.2 +0.5	24.30 +13	35.4 +2.1	30.64 +09	75.8 +3.7
28.5	37.81 +04	60.0 3.2	33.63 .10	32.8 0.3	24.41 .08	37.5 2.0	30.67 -03	79.5 3.7
Aug. 7.5	37.82 -01	63.1 3.0	33.70 +05	32.6 +0.1	24.47 +04	39.4 1.8	30.58 .15	83.2 3.6
17.4	37.79 .06	66.0 2.8	33.72 .00	32.6 0.0	24.48 -01	41.1 1.6	30.37 .26	86.7 3.4
27.4	37.70 .11	68.7 2.5	33.70 -04	32.7 -0.1	24.45 .05	42.5 1.4	30.06 .37	90.1 3.2
Sept. 6.4	37.57 -16	71.0 +2.2	33.64 -08	32.9 -0.2	24.38 -09	43.8 +1.1	29.64 -47	93.2 +2.9
16.4	37.40 .19	73.0 1.8	33.53 .12	33.2 0.3	24.28 .12	44.7 0.9	29.12 .56	95.9 2.6
26.3	37.20 .21	74.6 1.4	33.40 .14	33.5 0.4	24.15 .14	45.5 0.6	28.53 .62	98.3 2.1
Oct. 6.3	36.97 .23	75.8 1.0	33.25 .16	33.9 0.4	24.00 .15	45.9 0.3	27.88 .67	100.2 1.7
16.3	36.73 .24	76.5 +0.5	33.09 .16	34.2 0.4	23.84 .16	46.2 +0.1	27.19 .71	101.7 1.2
26.2	36.49 -24	76.8 0.0	32.92 -16	34.6 -0.3	23.68 -16	46.1 -0.2	26.47 -72	102.6 +0.6
Nov. 5.2	36.26 .23	76.6 -0.5	32.77 .15	34.9 0.3	23.52 .15	45.8 0.5	25.75 .71	102.9 +0.1
15.2	36.04 .21	75.9 0.9	32.63 .15	35.1 0.2	23.38 .15	45.2 0.7	25.04 .69	102.7 -0.5
25.2	35.85 .18	74.7 1.4	32.52 .10	35.3 0.2	23.26 .11	44.4 0.9	24.37 .64	101.9 2.1
Dec. 5.1	35.68 .15	73.1 1.8	32.43 .07	35.5 -0.1	23.16 .08	43.3 1.1	23.75 .58	100.5 2.7
15.1	35.56 -11	71.1 -2.2	32.38 -09	35.5 0.0	23.10 -05	42.1 -1.3	23.21 -50	98.6 -2.2
25.1	35.47 .06	68.8 2.5	32.37 +01	35.5 0.0	23.06 -01	40.7 1.4	22.76 .40	96.2 2.6
35.1	35.43 -02	66.2 -2.7	32.40 +04	35.5 +0.1	23.07 +02	39.2 -1.5	22.42 -29	93.4 -2.9

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	α Cygni.		μ Aquarii.		12 Year Cat. 1879.		ν Cygni.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 20 37	° ' " +44 54	h m 20 47	° ' " - 9 21	h m 20 52	° ' " +80 9	h m 20 53	° ' " +40 46
Jan. 0.1	56.11 -07	63.6 -2.6	9.04 +.01	60.2 -0.4	4.70 - .79	83.5 -2.5	21.26 -07	35.5 -2.4
10.1	56.06 -02	60.9 2.8	9.06 .04	60.6 0.4	4.02 .57	80.8 2.8	21.21 -03	33.0 2.6
20.0	56.06 +03	58.0 2.9	9.12 .07	60.9 0.3	3.56 .34	77.8 3.1	21.21 +02	30.3 2.7
30.0	56.11 .08	55.1 2.9	9.21 .11	61.2 0.2	3.34 - .10	74.6 3.2	21.25 .06	27.5 2.7
Feb. 9.0	56.22 .13	52.2 2.7	9.33 .14	61.3 -0.1	3.36 + .14	71.3 3.2	21.33 .11	24.8 2.6
19.0	56.37 +.18	49.6 -2.5	9.48 +.17	61.3 +0.1	3.62 + .38	68.1 -3.1	21.47 +.15	22.3 -2.4
28.9	56.57 .22	47.2 2.2	9.66 .19	61.0 0.3	4.12 .61	65.1 2.8	21.64 .20	20.0 2.1
Mar. 10.9	56.82 .27	45.3 1.7	9.87 .22	60.6 0.5	4.84 .81	62.4 2.4	21.86 .24	18.1 1.7
20.9	57.11 .30	43.8 1.2	10.10 .24	60.0 0.7	5.75 .99	60.2 2.0	22.12 .28	16.7 1.2
30.8	57.43 .33	42.9 0.7	10.36 .27	59.2 0.9	6.81 1.12	58.5 1.4	22.42 .31	15.7 0.7
Apr. 9.8	57.77 +.36	42.5 -0.1	10.63 +.29	58.2 +2.1	8.00 +1.22	57.3 -0.8	22.74 +.33	15.4 -0.1
19.8	58.14 .37	42.7 +0.5	10.93 .30	56.9 1.3	9.26 1.28	56.8 -0.2	23.08 .35	15.5 +0.5
29.8	58.52 .38	43.5 1.1	11.23 .31	55.5 1.5	10.55 1.29	56.9 +0.4	23.44 .36	16.3 1.0
May 9.7	58.90 .38	44.9 1.6	11.55 .31	54.0 1.6	11.83 1.26	57.6 1.0	23.80 .38	17.6 1.5
19.7	59.27 .36	46.8 2.1	11.86 .31	52.4 1.6	13.07 1.19	58.9 1.6	24.17 .35	19.3 2.0
29.7	59.62 +.34	49.1 +2.5	12.17 +.30	50.8 +1.6	14.22 +1.09	60.7 +2.1	24.51 +.34	21.6 +2.4
June 8.6	59.95 .31	51.8 2.9	12.46 .29	49.2 1.6	15.25 .95	63.1 2.6	24.84 .31	24.2 2.7
18.6	60.24 .27	54.8 3.1	12.74 .28	47.6 1.5	16.12 .79	65.9 2.9	25.14 .28	27.0 3.0
28.6	60.50 .23	58.0 3.3	12.99 .23	46.1 1.4	16.83 .61	69.0 3.2	25.40 .24	30.1 3.2
July 8.6	60.70 .18	61.4 3.4	13.20 .20	44.8 1.2	17.34 .41	72.4 3.5	25.62 .19	33.4 3.5
18.5	60.85 +.12	64.8 +3.4	13.38 +.16	43.6 +1.1	17.66 + .21	75.9 +3.6	25.78 +.14	36.7 +3.3
28.5	60.94 .06	68.2 3.3	13.51 .11	42.7 0.9	17.76 .00	79.6 3.7	25.90 .09	40.0 3.5
Aug. 7.5	60.97 +.01	71.5 3.2	13.60 .07	41.9 0.7	17.65 - .21	83.3 3.7	25.96 +.05	43.2 3.2
17.5	60.95 -05	74.7 3.0	13.64 +.02	41.2 0.5	17.34 .41	86.9 3.6	25.97 -02	46.3 3.0
27.4	60.88 .10	77.6 2.8	13.64 -02	40.8 0.3	16.83 .60	90.4 3.4	25.92 .07	49.2 2.7
Sept. 6.4	60.75 -15	80.2 +2.5	13.60 -06	40.6 +0.2	16.14 - .76	93.8 +3.2	25.83 -12	51.8 +2.4
16.4	60.58 .19	82.5 2.1	13.52 .10	40.5 0.0	15.27 .94	96.8 2.9	25.69 .12	54.1 2.1
26.3	60.37 .22	84.4 1.7	13.41 .12	40.5 -0.1	14.26 1.07	99.5 2.5	25.52 .18	56.0 1.7
Oct. 6.3	60.14 .24	85.9 1.3	13.28 .14	40.7 0.2	13.13 1.12	101.8 2.1	25.32 .21	57.5 1.3
16.3	59.88 .26	87.0 0.8	13.13 .15	40.9 0.3	11.90 1.22	103.7 1.6	25.10 .23	58.6 0.9
26.3	59.62 -26	87.5 +0.3	12.98 -15	41.3 -0.3	10.60 -1.32	105.0 +1.1	24.87 -23	59.3 +0.4
Nov. 5.2	59.36 .25	87.6 -0.2	12.83 .14	41.6 0.4	9.27 1.33	105.8 +0.5	24.63 .23	59.4 -0.1
15.2	59.12 .24	87.1 0.7	12.69 .11	42.1 0.4	7.94 1.32	106.1 -0.1	24.41 .22	59.1 0.6
25.2	58.89 .21	86.2 1.2	12.57 .13	42.5 0.4	6.64 1.26	105.7 0.6	24.20 .20	58.3 1.0
Dec. 5.2	58.69 .18	84.8 1.6	12.48 .08	43.0 0.5	5.41 1.17	104.8 1.2	24.02 .17	57.1 1.5
15.1	58.53 -14	82.9 -2.1	12.42 -05	43.4 -0.5	4.29 -1.05	103.3 -1.7	23.87 -14	55.4 -1.9
25.1	58.41 .10	80.6 2.4	12.38 -02	43.9 0.4	3.31 .89	101.3 2.2	23.75 .10	53.3 2.2
35.1	58.33 -06	78.1 -2.7	12.38 +02	44.3 -0.4	2.51 - .71	98.8 -2.6	23.67 -06	50.9 -2.5

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	6r Cygni.		ζ Cygni.		α Cephei.		γ Pegasi.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m 21 2	° ' " +38 14	h m 21 8	° ' " +29 48	h m 21 16	° ' " +62 8	h m 21 17	° ' " +19 21
Jan. 0.1	18.61 -.06	59.5 -2.2	35.09 -.05	37.0 -2.0	6.57 -.24	84.8 -2.4	21.80 -.04	69.9 -1.6
10.1	18.57 -.02	57.2 2.4	35.05 -.02	34.9 2.2	6.37 .17	82.2 2.8	21.77 -.01	68.2 1.7
20.1	18.57 +.02	54.7 2.5	35.05 +.02	32.6 2.3	6.24 .09	79.3 3.0	21.78 +.02	66.4 1.8
30.0	18.61 .07	52.2 2.5	35.09 .06	30.3 2.3	6.18 -.02	76.2 3.1	21.82 .06	64.6 1.8
Feb. 9.0	18.70 .11	49.7 2.4	35.17 .10	28.1 2.2	6.21 +.07	73.1 3.1	21.89 .09	62.9 1.7
19.0	18.83 +.15	47.3 -2.2	35.28 +.13	26.0 -2.0	6.31 +.15	70.0 -3.0	22.00 +.13	61.3 -2.5
28.9	19.01 .19	45.2 1.9	35.43 .17	24.1 1.7	6.50 .23	67.0 2.8	22.14 .16	59.9 1.2
Mar. 10.9	19.22 .23	43.5 1.5	35.62 .21	22.6 1.3	6.77 .30	64.4 2.4	22.32 .19	58.9 0.9
20.9	19.48 .27	42.2 1.1	35.85 .24	21.5 0.8	7.11 .37	62.2 1.9	22.52 .22	58.2 0.5
30.9	19.77 .30	41.3 -0.6	36.10 .27	20.8 -0.4	7.51 .43	60.5 1.4	22.76 .25	57.9 -0.1
Apr. 9.8	20.08 +.33	41.0 0.0	36.39 +.30	20.7 +0.1	7.97 +.48	59.4 -0.8	23.02 +.28	58.1 +0.4
19.8	20.42 .35	41.3 +0.5	36.70 .32	21.0 0.6	8.46 .51	58.9 -0.2	23.31 .30	58.6 0.8
29.8	20.78 .36	42.1 1.1	37.02 .33	21.8 1.1	8.99 .53	59.0 +0.4	23.61 .31	59.6 1.2
May 9.8	21.15 .36	43.4 1.6	37.35 .33	23.1 1.5	9.52 .53	59.7 1.0	23.93 .32	61.0 1.6
19.7	21.51 .36	45.2 2.0	37.68 .33	24.8 1.9	10.05 .52	61.0 2.6	24.25 .32	62.7 1.9
June 29.7	21.87 +.35	47.4 +2.4	38.01 +.32	26.9 +2.2	10.56 +.49	62.9 +2.1	24.56 +.31	64.8 +2.2
8.7	22.20 .32	50.0 2.8	38.32 .30	29.4 2.5	11.04 .45	65.3 2.6	24.87 .30	67.1 2.4
18.6	22.51 .29	52.9 3.0	38.61 .28	32.0 2.8	11.47 .41	68.0 3.0	25.15 .27	69.5 2.5
28.6	22.79 .25	56.1 3.2	38.87 .24	34.9 2.9	11.85 .34	71.2 3.3	25.41 .24	72.1 2.6
July 8.6	23.02 .21	59.3 3.3	39.10 .20	37.8 3.0	12.16 .27	74.6 3.5	25.64 .21	74.7 2.6
18.6	23.21 +.16	62.7 +3.3	39.28 +.16	40.8 +3.0	12.40 +.20	78.1 +3.6	25.83 +.17	77.3 +2.6
28.5	23.34 .11	66.0 3.5	39.42 .11	43.8 2.9	12.56 .12	81.8 3.7	25.98 .12	79.9 2.5
Aug. 7.5	23.43 .06	69.3 3.2	39.50 .06	46.6 2.8	12.64 +0.4	85.5 3.7	26.08 .08	82.3 2.5
17.5	23.46 +.01	72.4 3.0	39.54 +.01	49.3 2.6	12.63 -0.4	89.2 3.6	26.14 +0.3	84.5 2.1
27.5	23.44 -.04	75.3 2.8	39.53 -.03	51.8 2.4	12.55 .12	92.7 3.4	26.15 -.01	86.6 1.9
Sept. 6.5	23.37 -.09	77.9 +2.5	39.48 -.07	54.1 +2.1	12.40 -.19	96.0 +3.2	26.12 -.05	88.4 +1.7
16.4	23.27 .13	80.2 2.2	39.39 .11	56.1 1.8	12.17 .25	99.1 2.9	26.05 .09	89.9 1.4
26.4	23.12 .16	82.3 1.8	39.26 .14	57.7 1.5	11.89 .31	101.8 2.5	25.95 .12	91.2 1.1
Oct. 6.3	22.95 .18	83.9 1.4	39.11 .16	59.0 1.1	11.55 .35	104.1 2.1	25.82 .14	92.1 0.8
16.3	22.75 .20	85.1 1.0	38.93 .18	59.9 0.7	11.18 .39	106.0 1.6	25.67 .15	92.8 0.5
26.3	22.54 -.21	85.9 +0.5	38.75 -.18	60.4 +0.3	10.78 -.41	107.4 +1.1	25.52 -.16	93.1 +0.2
Nov. 5.3	22.34 .20	86.2 +0.1	38.56 .18	60.6 -0.1	10.36 .42	108.2 +0.6	25.36 .16	93.1 -0.2
15.2	22.14 .19	86.0 -0.4	38.38 .17	60.3 0.5	9.94 .41	108.5 0.0	25.20 .15	92.8 0.5
25.2	21.95 .18	85.4 0.8	38.22 .15	59.6 0.9	9.54 .40	108.2 -0.6	25.06 .13	92.2 0.8
Dec. 5.2	21.78 .15	84.3 1.3	38.07 .13	58.5 1.2	9.15 .37	107.3 1.2	24.94 .11	91.2 1.1
15.2	21.65 -.12	82.8 -1.7	37.95 -.11	57.1 -1.6	8.80 -.33	105.9 -1.7	24.83 -.09	90.0 -1.3
25.1	21.54 .09	81.0 2.0	37.86 .08	55.4 1.9	8.50 .27	103.9 2.2	24.76 .06	88.6 1.5
35.1	21.47 -.05	78.8 -2.3	37.80 -.04	53.4 -2.1	8.26 -.22	101.6 -2.6	24.71 -.03	87.0 -1.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Aquarii.		$\beta$ Cephei.		$\zeta$ Aquarii.		$\epsilon$ Pegasi.		
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	
	<div>h m</div> <div>21 26</div>	<div>° '</div> <div>— 6 0</div>	<div>h m</div> <div>21 27</div>	<div>° '</div> <div>+70 6</div>	<div>h m</div> <div>21 32</div>	<div>° '</div> <div>— 8 18</div>	<div>h m</div> <div>21 39</div>	<div>° '</div> <div>+ 9 24</div>	
	<div>°</div> <div>"</div>	<div>°</div> <div>"</div>	<div>°</div> <div>"</div>	<div>°</div> <div>"</div>	<div>°</div> <div>"</div>	<div>°</div> <div>"</div>	<div>°</div> <div>"</div>	<div>°</div> <div>"</div>	
Jan.	0.1	11.38 —.03	72.4 —0.6	17.38 —.39	61.1 —2.3	19.40 —.03	43.0 —0.4	10.51 —.03	30.0 —1.2
	10.1	11.37 .00	73.0 0.5	17.03 .90	58.6 2.7	19.38 .00	43.4 0.4	10.48 —.02	28.8 1.2
	20.1	11.39 +.03	73.4 0.4	16.77 .20	55.7 3.0	19.40 +.03	43.8 0.3	10.48 +.01	27.5 1.2
	30.0	11.43 .06	73.8 0.3	16.63 —.09	52.7 3.1	19.44 .06	44.0 —0.2	10.50 .04	26.3 1.2
Feb.	9.0	11.51 .10	74.1 —0.2	16.59 +.02	49.4 3.2	19.51 .09	44.1 0.0	10.56 .07	25.2 1.1
	19.0	11.62 +.13	74.1 0.0	16.67 +.14	46.3 —3.1	19.62 +.12	44.0 +0.2	10.65 +.10	24.2 —0.9
	28.9	11.76 .15	74.0 +0.2	16.87 .26	43.2 2.9	19.75 .15	43.8 0.4	10.77 .14	23.4 0.7
Mar.	10.9	11.93 .18	73.7 0.4	17.18 .96	40.4 2.6	19.92 .18	43.3 0.6	10.93 .17	22.9 0.4
	20.9	12.13 .21	73.2 0.7	17.60 .46	38.0 2.2	20.11 .21	42.6 0.8	11.11 .20	22.6 —0.1
	30.9	12.36 .24	72.4 0.9	18.11 .54	36.0 1.7	20.34 .24	41.7 1.0	11.33 .23	22.7 +0.3
Apr.	9.8	12.61 +.26	71.3 +1.1	18.69 +.61	34.6 —1.1	20.59 +.26	40.6 +1.2	11.57 +.25	23.2 +0.6
	19.8	12.89 .28	70.1 1.3	19.33 .66	33.8 —0.5	20.86 .28	39.3 1.4	11.84 .26	24.0 1.0
	29.8	13.18 .30	68.6 1.5	20.01 .69	33.6 +0.1	21.15 .30	37.8 1.6	12.13 .30	25.1 1.3
May	9.8	13.49 .31	67.0 1.7	20.71 .70	34.0 0.7	21.46 .31	36.1 1.7	12.43 .31	26.6 1.6
	19.7	13.80 .31	65.3 1.8	21.41 .68	35.1 1.3	21.77 .32	34.3 1.8	12.74 .31	28.3 1.8
	29.7	14.11 +.31	63.4 +1.8	22.08 +.65	36.7 +1.9	22.09 +.31	32.5 +1.8	13.06 +.31	30.3 +2.0
June	8.7	14.42 .30	61.6 1.8	22.71 .60	38.8 2.4	22.40 .30	30.7 1.8	13.36 .30	32.4 2.2
	18.6	14.71 .28	59.8 1.8	23.28 .33	41.4 2.8	22.70 .29	29.0 1.7	13.65 .28	34.6 2.2
	28.6	14.98 .26	58.1 1.7	23.76 .45	44.4 3.2	22.97 .26	27.3 1.6	13.93 .26	36.9 2.3
July	8.6	15.22 .22	56.5 1.5	24.19 .36	47.7 3.4	23.22 .23	25.8 1.4	14.17 .23	39.1 2.2
	18.6	15.43 +.19	55.0 +1.4	24.50 +.26	51.3 +3.6	23.43 +.19	24.4 +1.3	14.38 +.19	41.3 +2.2
	28.5	15.59 .15	53.7 1.2	24.71 .16	54.9 3.7	23.61 .15	23.3 1.1	14.55 .15	43.4 2.0
Aug.	7.5	15.72 .10	52.7 1.0	24.81 +.05	58.7 3.8	23.74 .11	22.3 0.8	14.68 .11	45.4 1.9
	17.5	15.80 .06	51.8 0.8	24.81 —.06	62.5 3.7	23.83 .06	21.6 0.6	14.76 .06	47.2 1.7
	27.5	15.83 +.01	51.1 0.6	24.70 .16	66.1 3.6	23.87 +.02	21.0 0.4	14.80 +.02	48.7 1.4
Sept.	6.5	15.82 —.02	50.7 +0.4	24.49 —.26	69.6 +3.4	23.86 —.02	20.7 +0.2	14.80 —.02	50.0 +1.2
	16.4	15.77 .06	50.4 +0.2	24.18 .34	72.9 3.1	23.82 .06	20.6 +0.1	14.76 .06	51.1 1.0
	26.4	15.69 .09	50.3 0.0	23.80 .42	75.9 2.8	23.74 .09	20.6 —0.1	14.69 .09	52.0 0.7
Oct.	6.3	15.59 .12	50.4 —0.1	23.34 .49	78.5 2.4	23.64 .11	20.8 0.2	14.59 .11	52.6 0.4
	16.3	15.46 .13	50.6 0.2	22.82 .54	80.6 1.9	23.52 .13	21.1 0.3	14.46 .13	53.0 +0.2
	26.3	15.32 —.14	50.9 —0.4	22.26 —.58	82.3 +1.4	23.38 —.14	21.4 —0.4	14.33 —.14	53.1 0.0
Nov.	5.3	15.18 .14	51.3 0.4	21.67 .60	83.5 0.9	23.24 .14	21.9 0.5	14.19 .14	53.0 —0.2
	15.2	15.04 .13	51.8 0.5	21.06 .60	84.1 +0.3	23.10 .13	22.3 0.5	14.05 .13	52.7 0.4
	25.2	14.92 .12	52.3 0.5	20.47 .59	84.1 —0.3	22.98 .12	22.9 0.5	13.92 .12	52.1 0.6
Dec.	5.2	14.81 .10	52.8 0.6	19.89 .56	83.4 0.9	22.87 .10	23.4 0.5	13.80 .11	51.4 0.8
	15.2	14.73 —.07	53.4 —0.6	19.36 —.51	82.3 —1.4	22.78 —.08	23.9 —0.5	13.70 —.09	50.5 —1.0
	25.1	14.67 .05	54.0 0.6	18.88 .44	80.6 2.0	22.72 .05	24.4 0.5	13.63 .06	49.4 1.1
	35.1	14.63 —.02	54.6 —0.6	18.48 —.36	78.3 —2.5	22.68 —.02	24.8 —0.4	13.58 —.04	48.2 —1.2

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	11 Cephei.		μ Capricorni.		79 Draconis.		α Aquarii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 21 40	° ' " +70 50	h m 21 47	° ' " -14 1	h m 21 51	° ' " +73 13	h m 22 0	° ' " -0 48
Jan. 0.1	22.60 -44	46.3 -2.1	44.25 -04	57.2 -0.2	31.82 -33	28.5 -2.0	32.81 -05	53.8 -0.7
10.1	22.21 .35	44.2 2.5	44.22 -01	57.3 -0.1	31.34 .43	26.3 2.4	32.77 -05	54.6 0.7
20.1	21.91 .84	41.5 2.9	44.22 +02	57.3 +0.1	30.96 .32	23.7 2.7	32.75 -05	55.3 0.7
30.0	21.72 .13	38.5 3.1	44.25 .05	57.2 0.2	30.70 .20	20.8 3.0	32.77 +05	55.9 0.6
Feb. 9.0	21.64 -01	35.3 3.2	44.32 .08	56.9 0.4	30.56 -06	17.7 3.2	32.81 .06	56.4 0.4
19.0	21.69 +.11	32.1 -3.2	44.41 +.11	56.4 +0.5	30.57 +07	14.5 -3.2	32.88 +09	56.7 -0.3
Mar. 1.0	21.86 .83	29.0 3.0	44.53 .14	55.8 0.7	30.71 .21	11.3 3.0	32.98 .12	56.9 0.0
10.9	22.15 .34	26.1 2.7	44.68 .17	55.0 0.9	31.00 .35	8.4 2.8	33.12 .15	56.8 +0.2
20.9	22.55 .45	23.6 2.3	44.87 .20	54.0 1.1	31.41 .47	5.8 2.4	33.29 .18	56.5 0.5
30.9	23.04 .54	21.5 1.8	45.08 .23	52.8 1.3	31.94 .58	3.5 2.0	33.48 .21	55.9 0.7
Apr. 9.9	23.63 +.62	20.0 -1.3	45.33 +.26	51.4 +1.5	32.57 +.67	1.8 -1.4	33.71 +.24	55.0 +1.0
19.8	24.27 .67	19.0 0.7	45.60 .28	49.8 1.6	33.28 .74	0.7 0.9	33.96 .27	53.9 1.2
29.8	24.97 .71	18.6 -0.1	45.89 .30	48.2 1.7	34.05 .79	0.1 -0.3	34.24 .29	52.5 1.5
May 9.8	25.69 .72	18.9 +0.6	46.20 .31	46.4 1.8	34.86 .81	0.2 +0.4	34.54 .30	50.9 1.7
19.7	26.42 .72	19.7 1.2	46.51 .32	44.6 1.8	35.67 .81	0.8 1.0	34.85 .31	49.1 1.8
29.7	27.12 +.69	21.2 +1.7	46.84 +.32	42.8 +1.8	36.47 +.78	2.1 +1.6	35.16 +.31	47.2 +1.9
June 8.7	27.79 .64	23.2 2.2	47.16 .31	41.1 1.7	37.23 .73	3.9 2.1	35.48 .30	45.2 2.0
18.7	28.41 .57	25.6 2.7	47.47 .30	39.4 1.6	37.94 .66	6.2 2.5	35.78 .29	43.2 2.0
28.6	28.94 .50	28.5 3.1	47.76 .28	37.9 1.4	38.56 .58	9.0 2.9	36.06 .27	41.2 1.9
July 8.6	29.40 .41	31.8 3.4	48.02 .25	36.6 1.2	39.09 .48	12.1 3.3	36.32 .25	39.3 1.8
18.6	29.76 +.31	35.2 +3.6	48.25 +.21	35.5 +1.0	39.52 +.37	15.5 +3.5	36.55 +.21	37.6 +1.7
28.6	30.01 .20	38.9 3.7	48.44 .17	34.6 0.8	39.83 .25	19.1 3.7	36.75 .17	35.9 1.5
Aug. 7.5	30.16 +0.9	42.7 3.8	48.59 .13	33.9 0.5	40.02 .13	22.9 3.8	36.90 .13	34.5 1.3
17.5	30.19 -0.2	46.4 3.7	48.70 .09	33.5 0.3	40.09 +0.1	26.7 3.8	37.01 .09	33.3 1.1
27.5	30.12 .13	50.2 3.6	48.75 +0.4	33.3 +0.1	40.03 -1.1	30.4 3.7	37.08 +0.4	32.3 0.9
Sept. 6.4	29.94 -0.3	53.8 +3.5	48.77 -0.1	33.3 -0.1	39.86 -0.22	34.1 +3.6	37.10 .00	31.5 +0.7
16.4	29.66 .32	57.1 3.2	48.74 .05	33.5 0.2	39.58 .33	37.6 3.4	37.08 -0.3	30.9 0.5
26.4	29.29 .41	60.2 2.9	48.67 .08	33.8 0.4	39.19 .43	40.8 3.1	37.03 .07	30.6 0.3
Oct. 6.4	28.85 .48	63.0 2.5	48.58 .11	34.2 0.5	38.71 .52	43.7 2.7	36.94 .09	30.4 +0.1
16.3	28.34 .54	65.3 2.1	48.46 .12	34.7 0.5	38.15 .59	46.2 2.3	36.84 .11	30.4 -0.1
26.3	27.78 -0.58	67.2 +1.6	48.33 -1.4	35.3 -0.6	37.52 -0.65	48.3 +1.8	36.72 -1.22	30.6 -0.2
Nov. 5.3	27.18 .61	68.5 1.1	48.19 .14	35.8 0.6	36.85 .68	49.8 1.5	36.59 .13	30.0 0.4
15.3	26.57 .62	69.3 +0.5	48.05 .13	36.4 0.5	36.15 .70	50.8 0.7	36.46 .13	31.3 0.5
25.2	25.95 .61	69.5 -0.1	47.92 .12	36.9 0.5	35.44 .70	51.2 +0.1	36.33 .12	31.9 0.6
Dec. 5.2	25.35 .58	69.2 0.7	47.81 .10	37.4 0.4	34.75 .68	51.1 -0.5	36.22 .11	32.5 0.7
15.2	24.79 -0.54	68.2 -1.3	47.71 -0.9	37.7 -0.3	34.08 -0.64	50.3 -1.1	36.12 -0.9	33.2 -0.7
25.1	24.27 .48	66.6 1.8	47.64 .06	38.0 0.2	33.47 .58	48.9 1.6	36.04 .07	33.9 0.7
35.1	23.83 -0.40	64.5 -2.3	47.59 -0.3	38.2 -0.2	32.93 -0.50	47.0 -2.1	35.98 -0.4	34.6 -0.7



## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\alpha$ Gruis.		$\theta$ Aquarii.		$\pi$ Aquarii.		$\gamma$ Aquarii.	
	Right Ascension.	Declination South.	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 22 1	° ' -47 26	h m 22 11	° ' - 8 17	h m 22 20	° ' + 0 51	h m 22 30	° ' - 0 38
Jan. 0.1	48.47 -11	86.8 +1.3	27.30 -06	28.5 -0.4	4.27 -06	37.9 -0.8	7.14 -07	33.2 -0.7
10.1	48.39 .06	85.3 1.6	27.25 .03	28.9 0.3	4.22 .04	37.1 0.7	7.08 .05	33.9 0.7
20.1	48.35 -02	83.5 1.9	27.23 -01	29.2 0.2	4.19 -02	36.4 0.7	7.04 -02	34.6 0.6
30.1	48.35 +02	81.5 2.1	27.24 +01	29.4 -0.1	4.18 +01	35.7 0.6	7.03 .00	35.1 0.5
Feb. 9.0	48.39 .07	79.2 2.3	27.27 .05	29.4 +0.1	4.21 .03	35.1 0.5	7.04 +03	35.6 0.4
19.0	48.49 +11	76.8 +2.5	27.34 +06	29.3 +0.2	4.26 +07	34.7 -0.3	7.09 +06	35.9 -0.2
Mar. 1.0	48.62 .16	74.2 2.6	27.43 .11	29.0 0.4	4.34 .10	34.5 -0.1	7.16 .09	36.0 0.0
11.0	48.80 .20	71.6 2.6	27.56 .14	28.5 0.6	4.46 .13	34.5 +0.1	7.26 .12	35.9 +0.2
20.9	49.03 .25	68.9 2.6	27.72 .18	27.7 0.9	4.60 .16	34.7 0.4	7.40 .16	35.6 0.5
30.9	49.30 .29	66.3 2.6	27.91 .21	26.7 1.1	4.78 .20	35.2 0.7	7.57 .19	35.0 0.7
Apr. 9.9	49.61 +33	63.8 +2.5	28.13 +24	25.5 +1.3	5.00 +23	36.0 +0.9	7.78 +22	34.1 +1.0
19.8	49.95 .36	61.4 2.3	28.38 .26	24.1 1.5	5.24 .26	37.1 1.2	8.01 .23	33.0 1.3
29.8	50.33 .39	59.1 2.1	28.65 .29	22.5 1.7	5.51 .28	38.4 1.3	8.28 .26	31.6 1.5
May 9.8	50.73 .41	57.1 1.9	28.95 .31	20.8 1.8	5.80 .30	40.0 1.7	8.56 .30	30.0 1.7
19.8	51.14 .42	55.3 1.6	29.26 .31	18.9 1.9	6.11 .31	41.8 1.8	8.87 .31	28.2 1.9
29.7	51.57 +43	53.9 +1.3	29.58 +32	17.0 +1.9	6.42 +31	43.7 +2.0	9.18 +31	26.3 +2.0
June 8.7	52.00 .42	52.8 0.9	29.90 .31	15.1 1.9	6.73 .31	45.7 2.0	9.50 .31	24.3 2.0
18.7	52.41 .40	52.1 0.5	30.21 .30	13.2 1.8	7.04 .30	47.8 2.1	9.81 .30	22.3 2.0
28.7	52.80 .38	51.7 +0.1	30.50 .28	11.4 1.7	7.34 .28	49.8 2.1	10.11 .29	20.2 2.0
July 8.6	53.16 .34	51.8 -0.3	30.77 .26	9.8 1.6	7.61 .26	51.8 1.9	10.38 .26	18.3 1.9
18.6	53.48 +29	52.3 -0.6	31.01 +22	8.3 +1.4	7.85 +23	53.7 +1.8	10.63 +23	16.5 +1.8
28.6	53.75 .24	53.1 1.0	31.22 .19	7.1 1.2	8.06 .19	55.4 1.6	10.85 .20	14.8 1.6
Aug. 7.5	53.96 .18	54.2 1.3	31.39 .14	6.0 0.9	8.23 .15	57.0 1.4	11.03 .17	13.3 1.4
17.5	54.11 .12	55.6 1.5	31.51 .10	5.2 0.7	8.36 .11	58.3 1.2	11.17 .12	12.0 1.2
27.5	54.19 +03	57.3 1.7	31.59 .06	4.6 0.5	8.44 .06	59.5 0.9	11.26 .07	10.9 0.9
Sept. 6.5	54.21 -01	59.1 -1.8	31.62 +01	4.3 +0.2	8.48 +02	60.4 +0.8	11.31 +03	10.1 +0.7
16.4	54.17 .07	60.9 1.9	31.62 -02	4.1 0.0	8.48 -02	61.0 0.6	11.32 -01	9.5 0.5
26.4	54.08 .12	62.8 1.8	31.57 .06	4.2 -0.1	8.45 .05	61.5 0.5	11.30 .04	9.2 0.3
Oct. 6.4	53.93 .16	64.6 1.7	31.50 .09	4.4 0.3	8.38 .08	61.7 +0.1	11.24 .07	9.0 +0.1
16.4	53.75 .20	66.2 1.5	31.40 .11	4.7 0.4	8.29 .10	61.8 0.0	11.15 .09	9.0 -0.1
26.3	53.54 -22	67.5 -1.2	31.28 -12	5.1 -0.5	8.18 -12	61.7 -0.2	11.05 -11	9.2 -0.2
Nov. 5.3	53.31 .23	68.6 0.9	31.16 .13	5.6 0.5	8.06 .12	61.4 0.3	10.94 .12	9.5 0.4
15.3	53.08 .23	69.3 0.5	31.03 .13	6.2 0.6	7.93 .12	61.0 0.2	10.82 .12	9.9 0.5
25.2	52.86 .22	69.6 -0.1	30.90 .12	6.8 0.6	7.81 .12	60.5 0.5	10.70 .12	10.5 0.6
Dec. 5.2	52.65 .20	69.5 +0.3	30.79 .11	7.3 0.6	7.69 .11	59.9 0.6	10.58 .11	11.1 0.6
15.2	52.46 -17	69.0 +0.7	30.68 -09	7.9 -0.5	7.59 -10	59.2 -0.7	10.48 -10	11.8 -0.7
25.2	52.31 .13	68.1 1.1	30.60 .07	8.4 0.5	7.50 .08	58.5 0.8	10.39 .08	12.5 0.7
35.1	52.20 -10	66.9 +1.4	30.54 -05	8.8 -0.4	7.43 -06	57.7 -0.8	10.31 -06	13.2 -0.7

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	226 Cephei (B.)		ζ Pegasi.		ε Cephei.		λ Aquarii.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination South.
	h m 22 30	° ' " +75 41	h m 22 36	° ' " +10 17	h m 22 46	° ' " +65 39	h m 22 47	° ' " - 8 6
Jan. 0.2	23.63 -71	83.3 -1.4	22.68 -08	62.0 -1.0	1.36 -39	70.1 -1.4	18.00 -08	79.7 -0.5
10.1	24.97 .61	81.6 2.0	22.61 .06	61.0 1.1	0.99 .34	68.5 1.9	17.93 .06	80.1 0.4
20.1	24.40 .50	79.4 2.4	22.56 .04	59.9 1.1	0.67 .28	66.4 2.5	17.88 .04	80.5 0.2
30.1	23.96 .37	76.7 2.8	22.54 -01	58.8 1.1	0.42 .21	63.8 2.7	17.86 -01	80.6 -0.1
Feb. 9.1	23.65 .23	73.8 3.0	22.54 +08	57.7 1.0	0.25 .13	61.0 2.9	17.85 +01	80.7 +0.1
19.0	23.50 -07	70.7 -3.1	22.57 +05	56.8 -0.9	0.16 -05	58.1 -3.0	17.88 +04	80.5 +0.5
Mar. 1.0	23.51 +10	67.5 3.1	22.63 .08	56.0 0.7	0.17 +05	55.0 3.0	17.94 .07	80.2 0.5
11.0	23.69 .26	64.5 3.0	22.73 .11	55.4 0.4	0.27 .15	52.1 2.9	18.03 .11	79.6 0.7
20.9	24.03 .41	61.6 2.7	22.86 .13	55.1 -0.1	0.46 .24	49.3 2.6	18.15 .14	78.8 0.9
30.9	24.53 .56	59.0 2.3	23.03 .18	55.1 +0.2	0.75 .33	46.9 2.2	18.31 .17	77.8 1.1
Apr. 9.9	25.15 +69	56.9 -1.9	23.23 +22	55.4 +0.5	1.13 +41	44.8 -1.8	18.50 +21	76.6 +1.4
19.9	25.90 .79	55.2 1.4	23.47 .25	56.1 0.8	1.58 .48	43.3 1.3	18.72 .24	75.1 1.6
29.8	26.74 .87	54.2 0.8	23.73 .28	57.1 1.1	2.09 .54	42.3 0.7	18.98 .27	73.5 1.7
May 9.8	27.64 .92	53.7 -0.2	24.02 .30	58.4 1.4	2.66 .58	41.8 -0.2	19.26 .29	71.6 1.9
19.8	28.57 .95	53.8 +0.4	24.32 .31	60.0 1.8	3.26 .60	42.0 +0.4	19.56 .31	69.7 2.0
29.8	29.52 +94	54.5 +1.0	24.64 +32	61.8 +1.9	3.87 +61	42.7 +1.0	19.87 +32	67.7 +2.0
June 8.7	30.45 .90	55.8 1.5	24.96 .32	63.9 2.1	4.47 .60	44.0 1.6	20.19 .32	65.7 2.0
18.7	31.33 .85	57.6 2.1	25.27 .31	66.0 2.2	5.06 .57	45.8 2.1	20.51 .31	63.8 1.9
28.7	32.14 .77	59.9 2.5	25.58 .29	68.3 2.5	5.62 .53	48.1 2.5	20.82 .30	61.9 1.8
July 8.6	32.86 .67	62.7 2.9	25.86 .27	70.6 2.5	6.12 .47	50.9 2.9	21.11 .28	60.1 1.7
18.6	33.48 +56	65.8 +3.5	26.11 +24	72.8 +2.2	6.56 +41	53.9 +3.2	21.37 +25	58.5 +1.5
28.6	33.98 .43	69.2 3.5	26.33 .20	75.0 2.1	6.94 .33	57.3 3.5	21.60 .28	57.2 1.2
Aug. 7.6	34.34 .30	72.8 3.7	26.51 .16	77.0 1.9	7.23 .25	60.8 3.6	21.80 .17	56.0 1.0
17.5	34.57 .16	76.6 3.8	26.65 .12	78.9 1.8	7.45 .17	64.5 3.7	21.96 .13	55.2 0.8
27.5	34.67 +02	80.4 3.8	26.75 .08	80.6 1.6	7.57 +08	68.2 3.7	22.07 .09	54.5 0.5
Sept. 6.5	34.62 -11	84.2 +3.7	26.80 +03	82.0 +1.4	7.61 .00	71.9 +3.6	22.14 +05	54.1 +0.5
16.5	34.44 .24	87.9 3.6	26.82 .00	83.3 1.1	7.57 -08	75.5 3.5	22.17 +01	54.0 +0.1
26.4	34.14 .36	91.5 3.4	26.79 -04	84.3 0.9	7.46 .16	78.9 3.3	22.16 -03	54.0 -0.1
Oct. 6.4	33.71 .48	94.7 3.1	26.74 .07	85.0 0.6	7.26 .23	82.1 3.0	22.11 .06	54.3 0.5
16.4	33.18 .58	97.7 2.8	26.66 .09	85.5 0.4	7.01 .29	85.0 2.7	22.04 .08	54.6 0.4
26.3	32.56 -66	100.3 +2.5	26.56 -11	85.8 +0.2	6.69 -34	87.4 +2.5	21.95 -10	55.1 -0.5
Nov. 5.3	31.86 .73	102.4 1.8	26.45 .12	85.9 -0.1	6.33 .38	89.5 1.8	21.84 .11	55.7 0.6
15.3	31.10 .78	104.0 1.5	26.32 .12	85.7 0.3	5.93 .41	91.0 1.5	21.72 .12	56.3 0.6
25.3	30.30 .81	105.0 0.7	26.20 .12	85.3 0.5	5.51 .43	92.0 0.7	21.60 .12	57.0 0.6
Dec. 5.2	29.48 .81	105.4 +0.1	26.08 .12	84.8 0.7	5.07 .43	92.4 +0.1	21.49 .11	57.6 0.6
15.2	28.68 -79	105.2 -0.5	25.97 -11	84.0 -0.8	4.64 -43	92.2 -0.5	21.38 -10	58.2 -0.6
25.2	27.91 .74	104.4 1.1	25.87 .09	83.1 0.9	4.22 .41	91.5 1.1	21.28 .09	58.7 0.5
35.2	27.19 -68	103.0 -1.6	25.79 -07	82.1 -1.0	3.83 -57	90.1 -1.6	21.20 -07	59.2 -0.4

## APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	♈ Pisces Australia. (Fomalhaut.)		♐ Pegasi. (Markab.)		♑ Cephei		♒ Piscium.	
	Right Ascension.	Declination South.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	h m	° '	h m	° '	h m	° '	h m	° '
	22 52	—30 9	22 59	+14 39	23 14	+67 33	23 22	+ 5 49
Jan. 0.2	1.33 —.10	51.9 +0.3	41.05 —.09	31.1 —1.0	25.10 —.45	35.0 —1.0	48.09 —.10	12.7 —0.8
10.2	1.25 .08	51.5 0.6	40.97 .08	30.1 1.1	24.68 .41	33.7 1.5	48.00 .08	11.9 0.8
20.1	1.18 .05	50.8 0.8	40.90 .06	28.9 1.2	24.29 .35	31.9 2.0	47.93 .07	11.1 0.8
30.1	1.14 —.02	49.8 1.1	40.85 .08	27.7 1.2	23.97 .29	29.6 2.4	47.87 .05	10.3 0.8
Feb. 9.1	1.13 +.01	48.6 1.5	40.83 —.01	26.4 1.2	23.72 .21	27.0 2.7	47.83 —.02	9.5 0.7
19.0	1.15 +.04	47.1 +1.6	40.84 +.02	25.3 —1.1	23.55 —.11	24.2 —2.9	47.82 .00	8.9 —0.6
Mar. 1.0	1.20 .07	45.4 1.8	40.88 .06	24.3 0.9	23.48 —.02	21.2 3.0	47.84 +.05	8.4 0.4
11.0	1.30 .11	43.5 2.0	40.95 .09	23.4 0.7	23.52 +.09	18.2 2.9	47.89 .07	8.1 —0.2
20.9	1.43 .15	41.5 2.1	41.06 .13	22.9 0.4	23.66 .19	15.4 2.8	47.97 .10	8.1 +0.1
30.9	1.59 .19	39.3 2.2	41.20 .17	22.6 —0.1	23.91 .29	12.7 2.5	48.10 .14	8.3 0.4
Apr. 9.9	1.80 +.22	37.0 +2.3	41.39 +.20	22.7 +0.2	24.25 +.39	10.4 —2.1	48.26 +.18	8.8 +0.6
19.9	2.04 .26	34.7 2.5	41.61 .24	23.1 0.6	24.69 .47	8.6 1.6	48.45 .21	9.6 0.9
29.8	2.31 .29	32.4 2.5	41.86 .27	23.8 0.9	25.20 .54	7.2 1.1	48.68 .24	10.7 1.2
May 9.8	2.62 .32	30.1 2.2	42.14 .29	25.0 1.3	25.78 .60	6.4 —0.5	48.94 .27	12.1 1.5
19.8	2.94 .35	27.9 2.1	42.45 .31	26.4 1.6	26.40 .64	6.2 +0.1	49.23 .29	13.6 1.7
29.8	3.29 +.35	25.9 +2.0	42.76 +.32	28.1 +1.8	27.05 +.65	6.5 +0.6	49.54 +.31	15.5 +1.9
June 8.7	3.64 .35	24.0 1.7	43.09 .32	30.0 2.0	27.71 .66	7.4 1.2	49.85 .32	17.4 2.0
18.7	3.99 .35	22.4 1.5	43.41 .32	32.1 2.2	28.36 .64	8.8 1.7	50.17 .32	19.5 2.1
28.7	4.33 .35	21.0 1.2	43.72 .30	34.4 2.5	28.98 .60	10.8 2.2	50.49 .31	21.6 2.1
July 8.7	4.66 .31	20.0 0.9	44.02 .28	36.7 2.3	29.56 .55	13.2 2.6	50.79 .29	23.8 2.1
18.6	4.96 +.28	19.3 +0.5	44.29 +.25	39.1 +2.5	30.09 +.49	16.0 +3.0	51.07 +.27	25.8 +2.0
28.6	5.22 .24	19.0 +0.2	44.53 .22	41.4 2.3	30.55 .43	19.2 3.3	51.32 .24	27.8 1.9
Aug. 7.6	5.44 .20	19.0 —0.2	44.73 .18	43.6 2.2	30.93 .34	22.6 3.5	51.54 .20	29.7 1.8
17.6	5.62 .15	19.4 0.5	44.89 .14	45.7 2.0	31.23 .26	26.1 3.6	51.72 .16	31.3 1.6
27.5	5.75 .11	20.0 0.8	45.01 .10	47.7 1.8	31.44 .17	29.8 3.7	51.87 .12	32.8 1.3
Sept. 6.5	5.83 +.06	20.9 —1.0	45.09 +.06	49.4 +1.6	31.56 +.08	33.6 +3.7	51.97 +.08	34.0 +1.1
16.5	5.87 +.01	22.0 1.2	45.13 +.02	50.9 1.4	31.60 —.01	37.2 3.6	52.03 .04	35.0 0.9
26.4	5.85 —.05	23.3 1.5	45.13 —.02	52.2 1.2	31.55 .09	40.8 3.5	52.05 +.01	35.8 0.7
Oct. 6.4	5.80 .07	24.6 1.4	45.09 .05	53.2 0.9	31.41 .17	44.2 3.2	52.04 —.02	36.3 0.4
16.4	5.71 .10	26.0 1.4	45.03 .07	53.9 0.6	31.20 .24	47.3 2.9	52.01 .05	36.6 +0.2
26.4	5.59 —.13	27.3 —1.5	44.95 —.09	54.5 +0.4	30.93 —.31	50.1 +2.6	51.94 —.07	36.7 0.0
Nov. 5.3	5.46 .14	28.6 2.1	44.84 .11	54.7 +0.1	30.59 .36	52.5 2.1	51.86 .09	36.7 —0.1
15.3	5.31 .15	29.6 1.0	44.73 .12	54.7 —0.1	30.20 .41	54.4 1.7	51.76 .10	36.4 0.3
25.3	5.16 .15	30.5 0.7	44.61 .12	54.5 0.3	29.77 .44	55.8 1.1	51.66 .11	36.0 0.5
Dec. 5.3	5.01 .14	31.1 0.5	44.49 .12	54.1 0.6	29.32 .46	56.6 +0.5	51.56 .11	35.5 0.6
15.2	4.87 —.13	31.4 —0.2	44.37 —.11	53.4 —0.8	28.85 —.47	56.9 —0.1	51.44 —.11	34.9 —0.7
25.2	4.75 .12	31.4 +0.1	44.26 .10	52.6 0.9	28.39 .46	56.5 0.7	51.33 .10	34.1 0.8
35.2	4.64 —.10	31.2 +0.4	44.16 —.09	51.5 —1.1	27.94 —.43	55.5 —1.2	51.23 —.09	33.3 —0.8

APPARENT PLACES FOR THE UPPER TRANSIT AT WASHINGTON.								
Mean Solar Date.	♄ Piscium.		γ Cephei.		Groombridge 4163.		♁ Piscium.	
	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.	Right Ascension.	Declination North.
	<sup>h</sup> <sup>m</sup> 23 34	<sup>°</sup> <sup>'</sup> + 5 4	<sup>h</sup> <sup>m</sup> 23 35	<sup>°</sup> <sup>'</sup> +77 3	<sup>h</sup> <sup>m</sup> 23 49	<sup>°</sup> <sup>'</sup> +73 50	<sup>h</sup> <sup>m</sup> 23 54	<sup>°</sup> <sup>'</sup> + 6 17
Jan. 0.2	42.78 -10	30.3 -0.8	7.30 -85	71.1 -0.5	51.14 -66	58.3 -0.4	5.06 -10	61.7 -0.7
10.2	42.69 -09	29.5 0.8	6.47 -80	70.3 1.1	50.48 -64	57.6 1.0	4.96 -10	60.9 0.8
20.2	42.61 -07	28.7 0.8	5.70 -73	68.8 1.7	49.87 -58	56.3 1.6	4.87 -09	60.2 0.8
30.1	42.55 -06	28.0 0.7	5.02 -62	66.9 2.2	49.31 -51	54.5 2.1	4.79 -07	59.4 0.7
Feb. 9.1	42.50 -04	27.3 0.6	4.46 -49	64.5 2.6	48.85 -41	52.2 2.5	4.73 -05	58.7 0.6
Mar. 19.1	42.48 -01	26.7 -0.5	4.04 -33	61.7 -2.9	48.49 -29	49.6 -2.8	4.69 -03	58.1 -0.5
1.1	42.49 +02	26.3 0.3	3.79 -16	58.7 3.0	48.26 -16	46.6 3.0	4.68 -00	57.6 0.4
11.0	42.52 -06	26.0 -0.1	3.72 +02	55.7 3.1	48.17 -02	43.6 3.0	4.70 +04	57.3 -0.2
21.0	42.60 -09	26.0 +0.1	3.83 -20	52.6 3.0	48.22 +13	40.6 -2.9	4.75 -07	57.2 0.0
30.9	42.71 -13	26.3 0.4	4.13 -38	49.7 2.8	48.43 -07	37.7 2.8	4.84 -11	57.4 +0.3
Apr. 9.9	42.86 +17	26.8 +0.7	4.60 +55	47.1 -2.5	48.77 +41	35.1 -2.5	4.98 +15	57.8 +0.6
19.9	43.05 -21	27.6 1.0	5.22 -70	44.8 2.0	49.25 -54	32.7 2.1	5.15 -19	58.6 0.9
29.9	43.27 -24	28.7 1.2	5.99 -85	43.0 1.5	49.85 -65	30.9 1.6	5.35 -23	59.6 1.1
May 9.9	43.52 -27	30.0 1.5	6.88 -93	41.7 1.0	50.55 -74	29.5 1.1	5.60 -26	60.8 1.4
19.8	43.81 -29	31.6 1.7	7.85 1.00	40.9 -0.5	51.34 -81	28.6 -0.6	5.87 -28	62.4 1.6
June 29.8	44.11 +31	33.4 +1.9	8.87 +1.04	40.8 +0.1	52.17 +85	28.3 0.0	6.16 +30	64.1 +1.8
8.8	44.42 -32	35.4 2.0	9.93 1.05	41.1 0.7	53.04 -87	28.6 +0.6	6.48 -31	66.0 2.0
18.7	44.75 -32	37.4 2.1	10.98 1.05	42.1 1.3	53.92 -87	29.5 1.1	6.80 -32	68.0 2.1
28.7	45.06 -31	39.5 2.1	12.00 -99	43.7 1.8	54.78 -84	30.9 1.6	7.12 -32	70.1 2.1
July 8.7	45.37 -30	41.6 2.1	12.96 -92	45.7 2.3	55.60 -79	32.8 2.1	7.43 -31	72.2 2.1
18.7	45.65 +28	43.6 +2.0	13.84 +83	48.2 +2.7	56.36 +73	35.1 +2.6	7.72 +28	74.3 +2.0
28.6	45.92 -25	45.6 1.9	14.63 -73	51.1 3.0	57.05 -65	37.9 2.9	8.00 -26	76.2 1.9
Aug. 7.6	46.14 -21	47.4 1.7	15.30 -60	54.3 3.3	57.65 -55	41.0 3.2	8.24 -23	78.1 1.8
17.6	46.34 -17	49.0 1.5	15.84 -47	57.8 3.6	58.15 -45	44.4 3.5	8.45 -19	79.8 1.6
27.6	46.49 -13	50.4 1.3	16.24 -33	61.4 3.7	58.55 -34	48.0 3.6	8.62 -15	81.2 1.4
Sept. 6.5	46.61 +09	51.6 +1.1	16.50 +19	65.2 +3.8	58.83 +22	51.7 +3.7	8.75 +11	82.5 +1.1
16.5	46.68 -06	52.5 0.8	16.62 +04	69.0 3.8	58.99 +11	55.4 3.8	8.85 -08	83.5 0.9
26.5	46.72 +02	53.2 0.6	16.59 -10	72.8 3.7	59.04 -01	59.2 3.7	8.90 -04	84.3 0.7
Oct. 6.4	46.72 -01	53.7 0.4	16.42 -24	76.5 3.6	58.97 -12	62.8 3.6	8.93 +01	84.9 0.4
16.4	46.70 -04	54.0 +0.2	16.11 -37	79.9 3.3	58.80 -23	66.3 3.4	8.92 -02	85.2 +0.2
26.4	46.65 -06	54.1 0.0	15.68 -49	83.1 +3.0	58.52 -33	69.5 +3.1	8.88 -05	85.4 0.0
Nov. 5.4	46.57 -08	53.9 -0.2	15.12 -60	86.0 2.6	58.13 -42	72.4 2.7	8.82 -07	85.3 -0.1
15.3	46.48 -09	53.7 0.4	14.47 -70	88.4 2.2	57.67 -51	74.8 2.2	8.75 -08	85.1 0.3
25.3	46.38 -10	53.2 0.5	13.73 -77	90.3 1.6	57.12 -57	76.8 1.7	8.66 -09	84.7 0.4
Dec 5.3	46.28 -11	52.7 0.6	12.92 -85	91.6 1.1	56.52 -62	78.2 1.2	8.56 -10	84.2 0.5
15.3	46.17 -11	52.1 -0.7	12.06 -86	92.4 +0.4	55.87 -66	79.1 +0.6	8.45 -11	83.6 -0.6
25.2	46.06 -10	51.3 0.8	11.20 -86	92.5 -0.2	55.21 -67	79.4 0.0	8.34 -11	82.9 0.7
35.2	45.96 -10	50.6 -0.8	10.34 -84	92.0 -0.8	54.54 -66	79.0 -0.6	8.24 -10	82.2 -0.8

## APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\beta$ Cassiop.	$\alpha$ Androm.	$\sigma$ Androm.	$\epsilon$ Ceti.	6 Urs. Min. S. P.	$\delta$ Piscium.	$\pi$ Androm.	$\theta$ Cassiop.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	31 25 0 3	44 30 0 5	53 47 0 13	99 23 0 14	358 16 0 13	88 38 0 20	56 51 0 31	42 16 0 39
(Dec. 30.2)	44.19 -31	1.55 -20	0.50 -15	14.50 -11	94.65+7.46	11.25 -12	26.67 -18	3.09 -20
Jan. 9.2	43.88 .30	1.35 .19	0.35 .15	14.40 .10	102.06 7.29	11.13 .10	26.50 .16	2.87 .21
19.2	43.59 .27	1.17 .18	0.21 .14	14.31 .09	109.24 6.93	11.04 .08	26.36 .15	2.65 .22
29.1	43.34 -23	1.00 -17	0.06 -14	14.22 -08	115.91+6.32	10.96 -06	26.21 -14	2.45 -20
Aug. 26.6	48.99 +25	5.61 +20	4.24 +20	17.84 +18	51.63-3.40	14.54 +17	30.17 +22	6.93 +26
Sept. 5.5	49.22 .19	5.79 .15	4.42 .15	17.98 .14	48.73 2.42	14.69 .14	30.37 .18	7.17 .21
15.5	49.36 .12	5.91 .10	4.55 .11	18.11 .10	46.83 1.38	14.81 .11	30.52 .13	7.35 .16
25.5	49.45 +06	6.00 .06	4.64 .07	18.19 .06	45.98- .30	14.90 .07	30.62 .09	7.48 .11
Oct. 5.4	49.48 .08	6.03 +02	4.68 +03	18.24 +03	46.24+ .79	14.95 .04	30.70 .05	7.57 .07
15.4	49.45 -05	6.02 -02	4.70 .00	18.24 .00	47.59+1.89	14.98 +01	30.73 +02	7.62 +03
25.4	49.37 .11	5.98 .06	4.68 -04	18.22 -03	50.03 2.98	14.97 -02	30.73 -01	7.62 -02
Nov. 4.4	49.22 .16	5.90 .10	4.63 .07	18.18 .06	53.55 4.02	14.93 .05	30.71 .04	7.58 .06
14.4	49.04 .20	5.77 .13	4.54 .10	18.11 .08	58.08 4.98	14.87 .07	30.64 .07	7.49 .10
24.3	48.81 .23	5.62 .15	4.43 .12	18.02 .10	63.52 5.82	14.80 .08	30.56 .10	7.37 .13
Dec. 4.3	48.57 -26	5.46 -17	4.29 -13	17.92 -10	69.73+6.32	14.71 -09	30.45 -12	7.22 -15
14.3	48.28 .29	5.28 .18	4.15 .14	17.83 .11	76.57 7.03	14.61 .10	30.32 .13	7.06 .17
24.2	47.99 .30	5.09 .19	4.00 .15	17.71 .11	83.82 7.33	14.51 .10	30.18 .15	6.86 .19
34.2	47.69 -31	4.89 -20	3.84 -16	17.60 -10	91.22+7.44	14.40 -11	30.03 -17	6.66 -20
Mean Solar Date.	$\delta$ Piscium.	$\gamma$ Cassiop.	$\mu$ Androm.	$\epsilon$ Cephei.	$\kappa$ Tucanae.	$\zeta$ Piscium.	$\kappa$ Octantis, S. P.	$\nu$ Androm.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	82 58 0 43	29 50 0 50	52 3 0 51	4 17 0 54	159 25 1 12	86 55 1 12	184 44 1 24	49 6 1 30
(Dec. 30.2)	24.32 -10	33.78 -31	6.29 -16	46.98-2.72	20.73 -37	33.34 -10	22.62+2.91	49.87 -15
Jan. 9.2	24.22 .10	33.46 .32	6.12 .16	44.26 2.72	20.17 .35	33.23 .11	25.57 2.95	49.71 .17
19.2	24.10 .11	33.14 .32	5.96 .17	41.55 2.68	19.62 .34	33.11 .12	28.52 2.89	49.53 .19
29.1	24.00 -11	32.83 -31	5.78 -17	38.92-2.62	19.09 -33	33.00 -11	31.35+2.74	49.32 -21
Sept. 5.6	27.63 +13	38.46 +27	9.98 +22	65.77+1.60	24.36 +39	36.36 +22	21.16-1.43	53.28 +26
15.6	27.76 .12	38.71 .22	10.17 .17	67.18 1.20	24.70 .29	36.54 .16	19.90 1.03	53.53 .22
25.5	27.87 .10	38.91 .16	10.29 .12	68.19 .79	24.95 .18	36.68 .12	19.09 .59	53.72 .18
Oct. 5.5	27.95 .07	39.03 .10	10.40 .08	68.77+ .37	25.06 +08	36.78 .09	18.71- .15	53.87 .14
15.5	28.00 +03	39.10 +04	10.45 .04	68.93- .06	25.09 -03	36.85 .06	18.83+ .36	53.98 .10
25.5	28.01 .00	39.11 -02	10.48 +01	68.68- .48	25.01 -14	36.89 +03	19.47+ .87	54.06 +06
Nov. 4.4	27.99 -02	39.05 .08	10.47 -02	67.95 .89	24.81 .24	36.90 .00	20.58 1.35	54.11 +03
14.4	27.97 .04	38.93 .14	10.42 .06	66.81 1.30	24.52 .33	36.88 -02	22.20 1.80	54.11 -01
24.4	27.91 .07	38.77 .19	10.35 .09	65.27 1.70	24.14 .41	36.85 .05	24.19 2.20	54.07 .05
Dec. 4.3	27.83 .09	38.56 .23	10.24 .11	63.37 2.06	23.68 .47	36.79 .07	26.59 2.32	54.00 .09
14.3	27.75 -10	38.31 -26	10.11 -13	61.14-2.36	23.19 -51	36.72 -09	29.25+2.75	53.91 -12
24.3	27.64 .10	38.02 .29	9.97 .15	58.66 2.58	22.66 .34	36.62 .10	32.10 2.89	53.77 .14
34.3	27.53 -10	37.71 -31	9.81 -16	56.02-2.72	22.10 -56	36.52 -10	35.05+2.94	53.61 -16

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\pi$ Piscium.	$\nu$ Piscium.	$\zeta$ Ceti.	$\gamma$ Androm.	$\beta$ Trianguli.	$\delta$ Urs. Min., S. P.	$\gamma$ Trianguli.	$\delta$ Ceti.
	$\begin{smallmatrix} \circ & ' \\ 78 & 23 \\ h & m \\ 1 & 31 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 85 & 2 \\ h & m \\ 1 & 36 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 100 & 50 \\ h & m \\ 1 & 46 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 48 & 10 \\ h & m \\ 1 & 57 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 55 & 30 \\ h & m \\ 2 & 3 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 348 & 2 \\ h & m \\ 2 & 9 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 56 & 37 \\ h & m \\ 2 & 11 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 96 & 54 \\ h & m \\ 2 & 11 \end{smallmatrix}$
(Dec. 30.3)	42.71 -10	8.65 -10	26.92 -11	39.70 -16	29.94 -12	12.80 +1.00	16.53 -11	55.19 -08
Jan. 9.3	42.60 .11	8.55 .11	26.80 .11	39.54 .17	29.80 .14	13.83 1.06	16.40 .13	55.09 .10
19.2	42.48 .12	8.43 .12	26.67 .12	39.37 .18	29.65 .13	14.92 1.11	16.25 .13	54.98 .12
29.2	42.36 .12	8.31 .12	26.54 .13	39.18 .19	29.48 .16	16.04 1.11	16.08 .16	54.83 .14
Feb. 8.2	42.24 .12	8.19 .11	26.41 .13	38.98 .18	29.31 .17	17.13 1.07	15.92 .16	54.70 .14
18.2	42.12 -12	8.09 -10	26.29 -12	38.81 -17	29.15 -16	18.18 +1.00	15.75 -17	54.57 -13
Sept. 25.6	45.99 +14	11.83 +14	29.88 +13	43.40 +22	33.40 +19	9.61 - .60	19.89 +20	57.98 +17
Oct. 5.5	46.11 .11	11.95 .11	30.01 .12	43.60 .18	33.59 .17	9.08 .44	20.09 .18	58.15 .14
15.5	46.21 .08	12.05 .08	30.11 .09	43.74 .14	33.73 .14	8.72 .27	20.25 .13	58.26 .11
25.5	46.27 +05	12.11 +05	30.19 +06	43.86 +10	33.85 +10	8.53 - .10	20.37 +11	58.36 +08
Nov. 4.5	46.30 +02	12.15 +03	30.23 +03	43.94 .06	33.94 .06	8.50 + .08	20.46 .08	58.43 .05
14.4	46.32 .00	12.16 .00	30.24 .00	43.98 +02	33.98 +02	8.67 .27	20.52 +04	58.46 +02
24.4	46.29 -03	12.15 -03	30.22 -03	43.98 -02	33.99 -01	9.03 .45	20.54 .00	58.47 -01
Dec. 4.4	46.26 .05	12.10 .05	30.18 .05	43.94 .06	33.96 .04	9.55 .61	20.52 -03	58.45 -04
14.3	46.19 -07	12.04 -07	30.13 -08	43.87 -10	33.91 -08	10.25 + .77	20.48 -07	58.40 -06
24.3	46.10 .09	11.95 .09	30.04 .10	43.76 .13	33.82 .11	11.10 .91	20.40 .10	58.33 .08
34.3	46.00 -10	11.85 -10	29.93 -11	43.60 -16	33.69 -13	12.08 +1.03	20.28 -12	58.24 -09
Mean Solar Date.	$\delta$ Hydri.	$\mu$ Hydri.	$\delta$ Ceti.	$\theta$ Persei.	$\sigma$ Arietis.	$\delta$ Cephei.	$\epsilon$ Arietis.	$\beta$ Persei. (Algol.)
	$\begin{smallmatrix} \circ & ' \\ 159 & 7 \\ h & m \\ 2 & 19 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 169 & 33 \\ h & m \\ 2 & 33 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 90 & 7 \\ h & m \\ 2 & 34 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 41 & 12 \\ h & m \\ 2 & 37 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 75 & 20 \\ h & m \\ 2 & 45 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 10 & 59 \\ h & m \\ 2 & 52 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 69 & 4 \\ h & m \\ 2 & 53 \end{smallmatrix}$	$\begin{smallmatrix} \circ & ' \\ 49 & 26 \\ h & m \\ 3 & 1 \end{smallmatrix}$
(Dec. 30.3)	58.61 -53	53.44 -14	16.87 -08	15.91 -15	53.33 -08	36.19 -71	24.51 -08	33.88 -07
Jan. 9.3	58.06 .56	52.25 1.22	16.78 .10	15.75 .18	53.25 .10	35.44 .22	24.43 .10	33.77 .12
19.3	57.48 .58	50.99 1.26	16.67 .12	15.55 .21	53.13 .12	34.56 .92	24.31 .12	33.62 .16
29.2	56.90 .58	49.72 1.26	16.53 .13	15.33 .23	53.00 .13	33.59 .98	24.17 .13	33.44 .18
Feb. 8.2	56.32 .57	48.46 1.24	16.39 .14	15.10 .24	52.85 .14	32.59 1.02	24.02 .14	33.25 .19
18.2	55.75 -56	47.23 -18	16.25 -14	14.86 -25	52.71 -14	31.57 -1.04	23.87 -13	33.05 -20
Sept. 25.6	60.59 +33	54.12 +67	19.55 +20	19.54 +28	56.10 +23	43.42 +95	27.32 +22	37.03 +29
Oct. 5.6	60.88 .23	54.70 .48	19.73 .17	19.81 .25	56.30 .19	44.30 .82	27.52 .20	37.30 .23
15.5	61.09 .13	55.09 .28	19.87 .13	20.05 .21	56.48 .13	45.04 .67	27.72 .18	37.53 .22
25.5	61.18 +04	55.25 +05	19.99 +13	20.24 +17	56.61 +12	45.64 +50	27.89 +13	37.74 +19
Nov. 4.5	61.17 -07	55.19 -18	20.08 .10	20.38 .12	56.72 .09	46.06 .33	28.00 .11	37.91 .13
14.5	61.04 .18	54.91 .40	20.15 .06	20.48 .07	56.82 .07	46.29 +16	28.10 .08	38.01 .11
24.4	60.80 .27	54.41 .60	20.18 +02	20.53 +02	56.87 .04	46.36 -03	28.16 .05	38.11 .07
Dec. 4.4	60.49 .36	53.71 .78	20.18 -01	20.53 -02	56.89 +01	46.24 .24	28.20 +02	38.14 +02
14.4	60.08 -44	52.84 -95	20.15 -04	20.49 -07	56.88 -02	45.91 -42	28.19 -02	38.14 -02
24.4	59.61 .50	51.81 1.08	20.11 .07	20.39 .12	56.84 .06	45.40 .59	28.15 .05	38.10 .07
34.3	59.09 -54	50.69 -18	20.03 -09	20.25 -16	56.76 -09	44.72 -76	28.08 -09	38.00 -11

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
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Mean Solar Date.	♈ Hydri.	♐ Octantis, S. P.	♉ Tauri.	♐ Camelop.	♈ Hydri.	♉ Persei.	♉ Tauri.	♉ Persei.
	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	167 46	185 52	77 25	18 59	164 33	50 17	68 12	42 34
	3 18	3 19	3 25	3 39	3 48	3 51	3 58	4 1
(Dec. 30.4)	34.35-.90	39.01+2.22	16.33-.04	39.59-.25	52.91-.61	2.84-.06	42.03-.02	18.05-.05
Jan. 9.3	33.41-.99	41.31+.37	16.27-.08	39.29-.36	52.24-.71	2.77-.10	41.99-.07	17.98-.10
19.3	32.38-1.06	43.73+.49	16.17-.12	38.88-.44	51.49-.79	2.65-.14	41.90-.11	17.84-.15
29.3	31.30-1.10	46.28+.54	16.05-.14	38.40-.51	50.66-.86	2.49-.17	41.78-.14	17.67-.19
Feb. 8.3	30.19-1.10	48.82+.54	15.90-.15	37.87-.55	49.79-.90	2.31-.19	41.63-.15	17.46-.22
18.2	29.08-1.09	51.36+2.49	15.75-.15	37.31-.56	48.88-.91	2.11-.20	41.48-.16	17.23-.24
28.2	27.99-1.08	53.80+2.39	15.60-.15	36.74-.57	47.96-.90	1.90-.21	41.31-.17	16.97-.25
Oct. 5.6	33.59+.61	48.17-1.04	18.99+.22	44.50+.62	51.57+.58	5.83+.32	44.61+.25	21.18+.34
15.6	34.12+.43	47.30-.67	19.21-.19	45.10-.55	52.10-.45	6.13-.28	44.86-.24	21.50-.32
25.5	34.46+.24	46.79-.28	19.38+.16	45.62+.47	52.49+.32	6.38+.24	45.09+.22	21.81+.29
Nov. 4.5	34.61+.05	46.69+.15	19.52-.14	46.03-.38	52.76-.18	6.61-.21	45.28-.19	22.08-.25
14.5	34.58-.13	47.06-.58	19.65-.11	46.37-.28	52.87+.03	6.79-.17	45.46-.15	22.30-.20
24.5	34.36-.31	47.81-.98	19.75-.08	46.59-.16	52.83-.11	6.94-.13	45.58-.11	22.48-.15
Dec. 4.4	33.95-.50	48.99-1.37	19.80-.04	46.69+.05	52.65-.25	7.04-.08	45.68-.08	22.59-.10
14.4	33.37-.67	50.54+1.72	19.82+.01	46.68-.07	52.33-.41	7.10+.03	45.74+.05	22.67+.04
24.4	32.63-.81	52.40+2.01	19.81-.02	46.54-.19	51.84-.54	7.10-.01	45.76+.01	22.68-.01
34.4	31.76-.94	54.53+2.28	19.76-.06	46.28-.30	51.26-.64	7.07-.06	45.74-.04	22.64-.06
Mean Solar Date.	♋ Eridani.	♈ Urs. Min., S. P.	♊ Mensæ.	♏ Persei.	♉ Tauri.	♉ Tauri.	♈ Aurigæ.	♋ Eridani.
	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''	°   '   ''
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	97 6	345 59	170 27	47 9	67 14	71 20	49 4	95 13
	4 6	4 20	4 24	4 26	4 36	4 45	4 55	5 2
(Dec. 30.4)	55.18-.03	24.19+.47	58.47-.90	17.01-.02	9.67+.01	26.71+.02	23.69+.03	52.27+.02
Jan. 9.4	55.13-.07	24.71-.61	57.46-1.10	16.97-.07	9.66-.03	26.71-.02	23.69-.03	52.26-.03
19.4	55.05-.10	25.40-.74	56.27-1.25	16.87-.11	9.60-.08	26.66-.06	23.64-.08	52.22-.07
29.3	54.94-.13	26.20-.83	54.95-1.37	16.73-.15	9.50-.12	26.58-.10	23.51-.13	52.13-.11
Feb. 8.3	54.80-.15	27.06-.90	53.53-1.45	16.56-.19	9.36-.14	26.44-.13	23.36-.17	52.01-.14
18.3	54.64-.18	28.00+.94	52.04-1.50	16.35-.21	9.21-.16	26.30-.15	23.17-.20	51.86-.16
28.3	54.46-.17	28.94-.93	50.54-1.49	16.13-.22	9.04-.17	26.14-.17	22.96-.22	51.69-.17
Mar. 10.2	54.29-.17	29.85+.88	49.06-1.46	15.91-.22	8.86-.17	25.96-.18	22.73-.23	51.52-.18
Oct. 15.6	57.43+.21	23.23-.75	53.67+.87	20.13+.33	12.26+.27	29.17+.25	26.52+.33	54.18+.24
25.6	57.63+.19	22.55-.61	54.44+.67	20.43+.30	12.52+.25	29.42+.25	26.84+.31	54.41+.23
Nov. 4.6	57.81-.17	22.00-.46	55.00+.45	20.72-.26	12.75-.22	29.66-.23	27.14-.29	54.64-.21
14.5	57.95-.14	21.61-.31	55.33+.21	20.95-.22	12.96-.19	29.87-.20	27.42-.26	54.83-.19
24.5	58.08-.10	21.36-.15	55.41-.04	21.16-.18	13.13-.16	30.05-.16	27.65-.22	55.02-.16
Dec. 4.5	58.16-.06	21.30+.02	55.24-.30	21.30-.13	13.27-.12	30.19-.12	27.84-.17	55.15-.12
14.5	58.20+.03	21.41+.20	54.81-.55	21.40+.08	13.36+.08	30.29+.08	27.97+.11	55.25+.08
24.4	58.21-.00	21.69-.37	54.15-.78	21.45+.03	13.41+.03	30.35+.04	28.05+.06	55.31+.04
34.4	58.18-.03	22.15+.54	53.26-.99	21.45-.03	13.42-.01	30.37-.00	28.09-.00	55.33-.00

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Mean Solar Date.	$\tau$ Orionis.	$\chi$ Aurigæ.	Groombr. 944.	$\kappa$ Orionis.	$\nu$ Aurigæ.	$\delta$ Doradus.	$\beta$ Aurigæ.	$\theta$ Aurigæ.
	° ' / 96 57 h m 5 12	° ' / 57 53 h m 5 26	° ' / 4 51 h m 5 29	° ' / 99 42 h m 5 42	° ' / 50 53 h m 5 44	° ' / 155 46 h m 5 44	° ' / 45 4 h m 5 52	° ' / 52 48 h m 5 52
(Dec. 30.5)	41.39 +.02	8.13 +.06	38.51-.16	57.32 +.06	28.14 +.09	38.91 -.13	6.06 +.09	48.92 +.09
Jan. 9.4	41.39 -.02	8.17 +.01	38.08 .66	57.35 +.01	28.20 +.03	38.72 .23	6.13 +.03	48.99 +.03
19.4	41.36 .06	8.15 -.04	37.19 1.13	57.33 -.04	28.19 -.03	38.45 .38	6.13 -.04	48.99 -.08
29.4	41.28 -.09	8.09 .09	35.82 1.56	57.27 .08	28.13 -.09	38.08 .40	6.06 .09	48.94 .07
Feb. 8.3	41.15 .18	7.96 .13	34.08 1.90	57.17 .18	28.01 .14	37.65 .46	5.94 .14	48.84 .12
18.3	41.01 -.05	7.81 -.16	32.01-2.17	57.02 -.13	27.86 -.17	37.15 -.51	5.77 -.18	48.69 -.16
28.3	40.84 .17	7.64 .18	29.73 2.32	56.86 .17	27.67 .19	36.61 .55	5.57 .21	48.51 .19
Mar. 10.3	40.67 .17	7.44 .19	27.36 2.39	56.69 .18	27.45 .21	36.04 .57	5.33 .23	48.30 .21
20.3	40.49 -.17	7.24 -.20	24.96-2.39	56.51 -.18	27.24 -.21	35.47 -.39	5.09 -.24	48.10 -.20
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Oct. 25.6	43.45 +.25	10.87 +.31	49.23+2.60	59.14 +.26	30.91 +.36	37.72 +.48	8.89 +.39	51.57 +.35
Nov. 4.6	43.68 .22	11.16 .28	51.69 2.29	59.39 .24	31.25 .33	38.16 .40	9.26 .36	51.90 .33
14.6	43.89 .19	11.43 .26	53.80 1.96	59.62 .22	31.56 .30	38.52 .32	9.60 .33	52.22 .30
24.5	44.07 .16	11.68 .23	55.60 1.57	59.84 .19	31.84 .26	38.80 .23	9.93 .29	52.50 .27
Dec. 4.5	44.21 .12	11.89 .19	56.95 1.12	60.01 .16	32.08 .22	38.98 .14	10.19 .24	52.75 .23
14.5	44.32 +.09	12.05 +.14	57.84+ .64	60.14 +.12	32.27 +.17	39.07 +.04	10.41 +.19	52.96 +.18
24.4	44.39 .05	12.15 .09	58.22+ .14	60.23 .07	32.40 .12	39.05 -.06	10.56 .13	53.10 .12
34.4	44.42 +.01	12.22 +.04	58.11- .34	60.28 +.02	32.49 +.06	38.92 -.17	10.66 +.07	53.20 +.06
Mean Solar Date.	$\gamma$ Geminor.	$\psi$ Aurigæ.	$\chi$ Draconis, S. P.	$\nu$ Geminor.	$\epsilon$ Geminor.	$\psi$ Aurigæ.	$\theta$ Geminor.	$\zeta$ Mensæ.
	° ' / 67 28 h m 6 8	° ' / 40 40 h m 6 17	° ' / 342 41 h m 6 22	° ' / 69 43 h m 6 22	° ' / 64 46 h m 6 37	° ' / 46 19 h m 6 39	° ' / 55 55 h m 6 46	° ' / 170 42 h m 6 48
(Dec. 30.5)	45.86 +.11	6.15 +.13	48.69 +.04	56.95 +.10	42.05 +.12	26.47 +.16	6.95 +.16	38.85-.13
Jan. 9.5	45.94 +.05	6.26 +.06	48.79 .16	57.04 .06	42.16 .08	26.59 .09	7.07 .10	38.57 .40
19.4	45.96 .00	6.28 -.01	49.03 .29	57.07 +.01	42.21 +.03	26.64 +.02	7.14 +.04	38.05 .65
29.4	45.93 -.04	6.24 .07	49.39 .42	57.06 -.04	42.22 -.03	26.64 -.04	7.15 -.02	37.28 .87
Feb. 8.4	45.85 .09	6.12 .13	49.87 .52	57.00 .08	42.16 .08	26.57 .10	7.10 .07	36.30 1.07
18.4	45.75 -.13	5.97 -.18	50.44 +.62	56.90 -.12	42.07 -.12	26.44 -.15	7.01 -.12	35.13-1.23
28.3	45.60 .16	5.76 .22	51.12 .70	56.75 .15	41.93 .15	26.26 .19	6.85 .16	33.83 1.56
Mar. 10.3	45.43 .18	5.50 .25	51.86 .74	56.59 .17	41.77 .17	26.06 .22	6.68 .18	32.40 1.46
20.3	45.24 .12	5.24 .27	52.61 .76	56.41 .18	41.59 .18	25.84 .23	6.48 .20	30.91 1.52
30.2	45.07 .17	4.96 .26	53.38 .77	56.24 .17	41.41 .18	25.60 .24	6.29 .21	29.38 1.53
Apr. 9.2	44.89 -.17	4.71 -.25	54.14 +.76	56.07 -.16	41.23 -.17	25.36 -.23	6.07 -.21	27.85-1.51
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Nov. 14.6	48.71 +.29	9.69 +.39	48.97 -.58	59.68 +.30	44.81 +.32	29.64 +.38	9.85 +.35	31.94+ .57
24.6	48.98 .25	10.06 .34	48.45 .46	59.95 .26	45.11 .28	29.99 .34	10.18 .31	32.81 .77
Dec. 4.6	49.21 .21	10.38 .29	48.06 .34	60.19 .22	45.37 .24	30.31 .30	10.47 .27	33.47 .54
14.5	49.40 +.16	10.64 +.24	47.79 -.20	60.40 +.18	45.60 +.20	30.59 +.25	10.72 +.22	33.89+ .29
24.5	49.54 .12	10.85 .18	47.65 -.05	60.57 .13	45.78 .15	30.82 .19	10.93 .17	34.05+ .02
34.5	49.64 +.07	10.98 +.10	47.66 +.10	60.67 +.07	45.91 +.10	30.97 +.12	11.08 +.13	33.93-.27



## APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS, FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\zeta$ Geminor.	63 Aurigæ.	$\gamma^a$ Volantis.	25 Camelop.	$\beta$ Can. Min	26 Lyncis.	Groombr. 1374.	$\omega^1$ Cancr.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	69 17 6 58	50 31 7 4	160 20 7 9	7 24 7 9	81 30 7 21	42 10 7 47	15 49 7 48	64 20 7 54
(Dec. 30.5)	6.20 +.14	41.54 +.18	40.26 +.05	53.20+ .68	39.60 +.16	20.60 +.25	6.64 +.51	48.25 +.21
Jan. 9.5	6.31 .09	41.68 .12	40.25 -.08	53.71+ .33	39.73 .11	20.82 .19	7.06 .33	48.43 .16
19.5	6.39 +.04	41.78 +.06	40.12 .20	53.85-. .01	39.82 .06	20.97 .12	7.30 +.16	48.57 .11
29.4	6.40 -.01	41.80 .00	39.87 .31	53.68 .34	39.86 +.01	21.06 +.05	7.39 .00	48.64 +.05
Feb. 8.4	6.38 .06	41.77 -.06	39.50 .42	53.13 .66	39.84 -.03	21.07 -.08	7.30 -.16	48.67 .00
18.4	6.30 -.11	41.68 -.12	39.04 -.51	52.30-. .96	39.79 -.07	21.01 -.09	7.05 -.32	48.63 -.05
28.4	6.18 .14	41.52 .17	38.49 .99	51.20 1.20	39.69 .11	20.87 .15	6.66 .44	48.56 .10
Mar. 10.3	6.03 .16	41.35 .20	37.88 .64	49.89 1.38	39.56 .13	20.70 .19	6.15 .55	48.44 .14
20.3	5.86 .17	41.14 .21	37.21 .67	48.42 1.50	39.41 .15	20.49 .22	5.56 .63	48.28 .16
30.3	5.69 .18	40.93 .22	36.53 .68	46.90 1.55	39.25 .16	20.26 .24	4.88 .68	48.12 .17
Apr. 9.2	5.51 -.17	40.71 -.22	35.84 -.69	45.34-1.55	39.08 -.16	20.00 -.26	4.18 -.70	47.95 -.17
19.2	5.34 -.17	40.51 -.20	35.17 -.67	43.82-1.49	38.92 -.15	19.75 -.25	3.48 -.69	47.78 -.16
Nov. 24.6	9.07 +.29	44.80 +.33	38.90 +.46	61.83+1.66	42.15 +.27	23.81 +.42	11.30 +.92	50.96 +.34
Dec. 4.6	9.34 .25	45.12 .31	39.33 .37	63.37 1.44	42.41 .25	24.21 .38	12.16 .81	51.28 .30
14.6	9.57 +.22	45.41 +.27	39.65 +.27	64.69+1.17	42.66 +.22	24.57 +.34	12.93 +.70	51.57 +.27
24.5	9.77 .18	45.66 .22	39.85 .15	65.70 .86	42.87 .18	24.89 .29	13.57 .58	51.83 .24
34.5	9.91 +.13	45.85 +.16	39.93 +.02	66.40+ .48	43.03 +.13	25.16 +.23	14.08 +.46	52.05 +.20
Mean Solar Date.	$\zeta^1$ Cancr.	$\beta$ Cancr.	30 Monoce- rotis.	$\theta$ Chamæ- leontis.	$\sigma$ Hydræ.	$\gamma$ Cancr.	$\sigma^2$ Cancr. (mean.)	$\theta$ Hydræ.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	72 3 8 6	80 30 8 11	93 34 8 20	167 9 8 23	86 18 8 33	68 10 8 37	59 2 8 48	87 15 9 9
(Dec. 30.6)	24.20 +.20	1.35 +.20	35.97 +.22	46.15+ .34	27.92 +.21	25.48 +.25	3.94 +.26	5.57 +.26
Jan. 9.5	24.38 .16	1.53 .16	36.16 .16	46.41+ .17	28.12 .18	25.70 .20	4.18 .22	5.80 .21
19.5	24.52 .11	1.67 .11	36.28 .10	46.50 .00	28.27 .14	25.88 .15	4.37 .17	5.99 .16
29.5	24.61 .06	1.75 .06	36.37 .05	46.39-. .17	28.38 .09	25.99 .09	4.51 .11	6.11 .11
Feb. 8.5	24.65 +.01	1.79 +.01	36.40 +.01	46.12 .34	28.43 +.03	26.06 +.03	4.59 +.05	6.21 .06
18.4	24.63 -.04	1.77 -.04	36.40 -.03	45.67-. .50	28.44 -.02	26.07 -.02	4.63 .00	6.25 +.01
28.4	24.56 .09	1.71 .08	36.34 .07	45.06 .65	28.39 .06	26.03 .06	4.59 -.06	6.23 -.03
Mar. 10.4	24.45 .12	1.62 .12	36.25 .10	44.33 .78	28.32 .10	25.96 .10	4.51 .11	6.19 .07
20.4	24.32 .14	1.48 .14	36.12 .13	43.50 .88	28.21 .13	25.84 .13	4.38 .14	6.10 .10
30.3	24.17 .15	1.34 .15	35.98 .15	42.58 .94	28.07 .14	25.70 .15	4.24 .16	6.00 .12
Apr. 9.3	24.01 -.16	1.19 -.16	35.82 -.16	41.61-. .96	27.92 -.15	25.54 -.16	4.08 -.17	5.86 -.13
19.3	23.84 .16	1.03 .15	35.66 .15	40.61 .98	27.77 .15	25.38 .16	3.90 .17	5.72 .14
29.2	23.70 .15	0.88 .14	35.52 .14	39.60 1.00	27.63 .14	25.22 .15	3.73 .16	5.59 .13
May 9.2	23.57 -.13	0.76 -.12	35.39 -.12	38.62-. .98	27.50 -.12	25.08 -.14	3.58 -.15	5.46 -.12

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
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Mean Solar Date.	$\beta$ Argus.	$\alpha$ Lyncis.	$\iota$ Leonis Minoris.	$\epsilon$ Leonis.	$\zeta$ Chamæ- leontis.	$\nu$ Leonis Minoris.	$\pi$ Leonis.	$\lambda$ Ursæ Ma- joris.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	159 18 h m 9 12	55 11 h m 9 14	53 9 h m 9 28	79 39 h m 9 35	170 29 h m 9 36	48 28 h m 9 51	81 28 h m 9 54	46 35 h m 10 10
(Dec. 30.6)	s 7.53 +.41	s 53.04 +.30	s 1.15 +.30	s 44.46 +.27	s 57.82 +.86	s 28.89 +.35	s 51.33 +.28	s 59.23 +.38
Jan. 9.6	7.88 .29	53.32 .25	1.44 .27	44.71 .23	58.58 .65	29.22 .31	51.59 .25	59.59 .34
19.6	8.12 .17	53.55 .20	1.70 .23	44.93 .19	59.13 .43	29.51 .26	51.83 .21	59.91 .29
29.5	8.24 +.05	53.74 .14	1.90 .18	45.10 .14	59.44 +.19	29.74 .20	52.01 .17	60.16 .23
Feb. 8.5	8.24 -.06	53.84 .08	2.02 .11	45.22 .09	59.51 -.05	29.89 .14	52.15 .12	60.36 .17
18.5	8.13 -.17	53.89 +.02	2.09 +.04	45.28 +.04	59.34 -.27	29.99 +.08	52.23 +.07	60.49 +.10
28.5	7.91 .27	53.89 -.03	2.10 -.02	45.30 .00	58.96 .48	30.04 +.03	52.27 +.02	60.55 +.04
Mar. 10.4	7.59 .36	53.83 .08	2.06 .07	45.28 -.04	58.37 .67	30.02 -.03	52.27 -.02	60.55 -.03
20.4	7.19 .43	53.74 .12	1.97 .12	45.21 .08	57.62 .83	29.94 .09	52.22 .06	60.49 .09
30.4	6.73 .48	53.59 .15	1.83 .15	45.13 .11	56.70 .98	29.81 .13	52.15 .09	60.38 .13
Apr. 9.3	6.22 -.52	53.43 -.17	1.67 -.17	45.01 -.13	55.65 -1.10	29.66 -.16	52.05 -.12	60.23 -.15
19.3	5.68 .55	53.25 .18	1.50 .18	44.88 .14	54.50 1.18	29.48 .18	51.93 .13	60.06 .17
29.3	5.12 .56	53.07 .18	1.31 .18	44.75 .14	53.29 1.23	29.29 .19	51.81 .13	59.87 .19
May 9.3	4.55 .57	52.90 .17	1.14 .18	44.62 .14	52.04 1.26	29.10 .19	51.68 .13	59.67 .20
19.2	3.99 -.56	52.74 -.15	0.97 -.17	44.49 -.13	50.77 -1.28	28.91 -.18	51.55 -.12	59.48 -.19
Mean Solar Date.	$\mu$ Hydræ.	$\beta$ Leonis Minoris.	$\alpha$ Antliæ.	$\beta$ Octantis, S. P.	$\epsilon$ Leonis Minoris.	$\delta$ Chamæ- leontis.	$\epsilon$ Leonis Minoris.	Groombr. 1706.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	106 19 h m 10 21	52 46 h m 10 22	120 33 h m 10 22	188 5 h m 10 35	66 17 h m 10 37	170 0 h m 10 44	55 14 h m 10 47	11 41 h m 10 51
Jan. 19.6	s 11.63 +.22	s 2.05 +.28	s 31.13 +.22	s 35.02 -.70	s 54.70 +.25	s 54.40 +.81	s 39.14 +.30	s 55.81 +.94
29.6	11.84 .18	2.30 .22	31.34 .18	34.44 .45	54.93 .21	55.09 .60	39.41 .24	56.64 .76
Feb. 8.6	11.98 .13	2.49 .17	31.48 .13	34.11 -.21	55.12 .17	55.59 .40	39.62 .19	57.31 .56
18.5	12.09 .08	2.62 .11	31.59 .08	34.02 +.02	55.26 .12	55.88 +.19	39.78 .13	57.76 .35
28.5	12.14 +.03	2.70 +.05	31.65 +.03	34.16 .26	55.35 .07	55.96 -.02	39.89 .07	58.01 +.14
Mar. 10.5	12.16 -.01	2.71 .00	31.64 -.02	34.54 +.50	55.38 +.02	55.83 -.22	39.93 +.02	58.04 -.07
20.4	12.13 .05	2.68 -.05	31.61 .06	35.16 .72	55.37 -.02	55.51 .40	39.93 -.03	57.86 .28
30.4	12.07 .08	2.60 .10	31.53 .09	35.98 .92	55.33 .06	55.02 .56	39.88 .07	57.49 .46
Apr. 9.4	11.98 .10	2.48 .14	31.43 .12	37.01 1.11	55.25 .09	54.37 .70	39.79 .10	56.94 .62
19.4	11.88 .11	2.33 .16	31.30 .14	38.21 1.27	55.15 .11	53.59 .82	39.68 .13	56.25 .74
29.3	11.76 -.12	2.17 -.17	31.15 -.15	39.56 +1.41	55.03 -.13	52.69 -.93	39.53 -.15	55.45 -.84
May 9.3	11.64 .12	2.00 .17	31.01 .15	41.04 1.52	54.89 .14	51.68 1.03	39.38 .15	54.57 .91
19.3	11.51 .12	1.83 .16	30.86 .14	42.61 1.58	54.76 .13	50.64 1.09	39.23 .15	53.63 .93
29.3	11.39 .12	1.67 .15	30.71 .14	44.25 1.62	54.64 .13	49.54 1.13	39.07 .15	52.70 .92
June 8.2	11.27 -.11	1.53 -.14	30.58 -.13	45.88 +1.64	54.52 -.12	48.41 -1.15	38.94 -.13	51.79 -.91

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
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Mean Solar Date.	$\eta$ Octantia.	$\rho^a$ Leonis.	$\psi$ Urs. Maj.	$\nu$ Urs. Maj.	$\xi$ Hydræ.	$\chi$ Urs. Maj.	$\pi$ Virginis.	$\epsilon$ Corvi.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	174 3 10 59	87 29 11 1	44 57 11 3	56 21 11 13	121 18 11 28	41 39 11 40	82 49 11 55	112 3 12 4
Feb. 8.6	71.51+ .72	44.48 +.15	59.20 +.23	1.38 +.22	1.43 +.21	43.27 +.29	41.12 +.23	54.97 +.24
18.6	72.09 .42	44.61 .12	59.40 .16	1.57 .16	1.62 .16	43.53 .22	41.32 .18	55.19 .20
28.5	72.34+ .10	44.72 .08	59.53 .09	1.70 .11	1.75 .11	43.72 .15	41.47 .13	55.37 .15
Mar. 10.5	72.26- .24	44.78 +.04	59.60 +.03	1.78 +.06	1.84 .06	43.83 .08	41.59 .09	55.48 .10
20.5	71.86 .55	44.80 .00	59.61 -.03	1.80 .00	1.87 +.02	43.88 +.02	41.66 .05	55.57 .06
30.4	71.16- .84	44.78 -.03	59.58 -.09	1.78 -.04	1.88 -.02	43.88 -.03	41.71 +.01	55.61 +.03
Apr. 9.4	70.18 1.09	44.74 .06	59.47 .12	1.72 .08	1.85 .05	43.82 .08	41.71 -.02	55.63 .00
19.4	68.97 1.33	44.66 .08	59.34 .15	1.63 .11	1.79 .08	43.72 .12	41.68 .04	55.62 -.02
29.4	67.52 1.54	44.58 .09	59.18 .17	1.51 .13	1.70 .11	43.57 .16	41.63 .06	55.58 .05
May 9.3	65.89 1.69	44.48 .10	59.00 .18	1.37 .14	1.60 .13	43.39 .18	41.56 .07	55.52 .07
19.3	64.14-1.80	44.37 -.10	58.81 -.19	1.22 -.15	1.46 -.13	43.20 -.19	41.48 -.08	55.43 -.08
29.3	62.29 1.88	44.27 .11	58.60 .20	1.08 .15	1.34 .13	43.00 .20	41.39 .09	55.35 .09
June 8.3	60.39 1.90	44.16 .11	58.41 .19	0.92 .15	1.20 .14	42.78 .21	41.29 .10	55.25 .10
18.2	58.50-1.89	44.06 -.10	58.23 -.18	0.78 -.14	1.06 -.13	42.58 -.20	41.19 -.10	55.14 -.11
Mean Solar Date.	$z$ Can. Ven.	$6$ Urs. Min.	$\delta^a$ Corvi.	$\beta$ Can. Ven.	$\gamma$ Virginis, (mean.)	$31$ Comæ Berenices.	$\gamma$ Cassiop., S. P.	$43$ Cephei, S. P.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	48 46 12 11	1 44 12 14	105 57 12 24	48 5 12 28	90 53 12 36	61 54 12 46	330 10 12 50	355 43 12 54
Feb. 8.6	3.80 +.29	62.07+5.48	37.51 +.25	56.67 +.29	31.70 +.25	46.28 +.28	32.55 -.30	36.39-2.30
18.6	4.06 .24	66.95 4.27	37.74 .21	56.94 .25	31.93 .20	46.54 .24	32.28 .22	34.28 1.91
28.6	4.27 .19	70.61 3.02	37.93 .17	57.17 .20	32.11 .16	46.76 .20	32.09 .14	32.58 1.48
Mar. 10.5	4.41 .13	72.99 1.68	38.06 .13	57.34 .15	32.26 .12	46.94 .16	31.98 .07	31.32 1.01
20.5	4.51 .07	73.96+ .27	38.18 .09	57.45 .09	32.37 .09	47.07 .12	31.91 -.01	30.57- .49
30.5	4.55 +.02	73.52-1.12	38.24 +.05	57.52 +.04	32.46 +.06	47.15 +.07	31.93 +.06	30.36+ .07
Apr. 9.5	4.55 -.03	71.71 2.45	38.28 +.02	57.53 -.01	32.50 +.03	47.20 +.03	32.04 .13	30.72 .61
19.4	4.50 .07	68.62 3.67	38.29 -.01	57.50 .05	32.51 .00	47.20 -.01	32.23 .21	31.59 1.12
29.4	4.42 .11	64.37 4.74	38.27 .03	57.43 .08	32.50 -.02	47.18 .04	32.50 .29	32.96 1.60
May 9.4	4.30 .13	59.13 5.64	38.23 .05	57.33 .11	32.47 .04	47.12 .07	32.85 .37	34.80 2.02
19.4	4.15 -.15	53.09-6.33	38.16 -.07	57.19 -.13	32.42 -.06	47.05 -.09	33.28 +.44	37.01+2.38
29.3	3.99 .16	46.47 6.82	38.09 .08	57.04 .15	32.35 .07	46.95 .10	33.73 .49	39.56 2.66
June 8.3	3.82 .17	39.45 7.12	38.00 .09	56.87 .17	32.27 .08	46.84 .11	34.23 .53	42.33 2.85
18.3	3.65 -.16	32.24-7.24	37.91 -.09	56.69 -.18	32.18 -.09	46.72 -.12	34.78 +.56	45.26+3.00

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	$\delta$ Muscæ.	$\epsilon$ Virginis.	$20$ Can. Ven.	$\kappa$ Octantis.	B. A. C. 4536.	$m$ Virginis.	$\theta$ Apodis.	$\pi$ Hydræ.
	$^{\circ}$ 161 0	$^{\circ}$ 78 30	$^{\circ}$ 48 53	$^{\circ}$ 175 16	$^{\circ}$ 52 18	$^{\circ}$ 98 11	$^{\circ}$ 166 18	$^{\circ}$ 116 11
	h m 12 55	h m 12 57	h m 13 13	h m 13 24	h m 13 30	h m 13 36	h m 13 55	h m 14 0
Mar. 0.6	20.91 +.44	8.60 +.19	1.04 +.22	38.57 +1.92	17.20 +.27	17.89 +.23	28.56 +.83	36.07 +.26
10.6	21.31 .35	8.77 .15	1.26 .18	40.33 1.57	17.44 .21	18.10 .19	29.34 .72	36.31 .23
20.6	21.62 .25	8.90 .12	1.44 .14	41.72 1.20	17.62 .16	18.27 .15	30.00 .60	36.54 .19
30.5	21.84 .15	9.00 .08	1.54 .09	42.74 .83	17.75 .11	18.41 .12	30.53 .47	36.71 .15
Apr. 9.5	21.94 +.06	9.06 .05	1.62 +.04	43.37 .45	17.85 .07	18.52 .09	30.93 .34	36.85 .12
19.5	21.96 -.03	9.09 +.02	1.64 .00	43.63 +.06	17.89 +.03	18.59 +.06	31.21 +.21	36.97 +.09
29.4	21.89 .11	9.09 -.01	1.63 -.04	43.48 -.33	17.90 -.01	18.64 .03	31.34 +.07	37.05 .06
May 9.4	21.73 .19	9.07 .04	1.57 .07	42.96 .71	17.87 .04	18.66 +.01	31.35 -.06	37.10 .03
19.4	21.49 .26	9.02 .06	1.48 .10	42.06 1.05	17.81 .08	18.66 -.02	31.22 .18	37.12 +.01
29.4	21.19 .34	8.96 .07	1.37 .13	40.85 1.36	17.72 .11	18.63 .04	30.98 .30	37.12 -.01
June 8.3	20.80 -.41	8.88 -.08	1.21 -.15	39.34 -1.65	17.60 -.13	18.58 -.06	30.62 -.42	37.10 -.03
18.3	20.37 .46	8.79 .09	1.05 .16	37.55 1.89	17.46 .14	18.53 .08	30.14 .51	37.03 .06
28.3	19.89 .47	8.68 .10	0.88 .17	35.55 2.08	17.31 .16	18.44 .09	29.59 .60	36.96 .09
July 8.3	19.43 -.46	8.58 -.10	0.70 -.18	33.38 -2.22	17.14 -.17	18.35 -.10	28.94 -.66	36.85 -.11
Mean Solar Date.	$\delta$ Bootis.	$\kappa$ Virginis.	4 Urs. Min.	$\delta$ Octantis.	$\lambda$ Bootis.	$\lambda$ Virginis.	$\mu$ Hydri, S. P.	$\alpha$ Apodis.
	$^{\circ}$ 64 26	$^{\circ}$ 99 48	$^{\circ}$ 11 58	$^{\circ}$ 173 12	$^{\circ}$ 43 27	$^{\circ}$ 102 54	$^{\circ}$ 190 27	$^{\circ}$ 168 37
	h m 14 5	h m 14 7	h m 14 9	h m 14 10	h m 14 12	h m 14 13	h m 14 33	h m 14 35
Mar. 20.6	47.66 +.19	29.99 +.19	20.64 +.58	45.28 +1.26	33.39 +.22	38.13 +.20	44.12 -.85	19.12 +.88
30.6	47.83 .14	30.16 .15	21.13 .39	46.41 1.01	33.59 .18	38.31 .16	43.34 .69	19.94 .75
Apr. 9.5	47.94 .10	30.30 .11	21.42 .20	47.30 .75	33.73 .13	38.45 .13	42.74 .51	20.61 .60
19.5	48.03 .07	30.40 .08	21.52 +.01	47.90 .48	33.83 .08	38.57 .10	42.33 .33	21.14 .45
29.5	48.09 .04	30.49 .06	21.44 -.18	48.25 +.20	33.88 +.03	38.66 .07	42.10 -.14	21.50 .29
May 9.5	48.12 +.01	30.53 +.04	21.17 -.34	48.30 -.08	33.87 -.02	38.72 +.04	42.06 +.05	21.69 +.12
19.4	48.11 -.02	30.57 +.02	20.74 .48	48.09 .34	33.82 .06	38.75 +.01	42.23 .26	21.74 -.05
29.4	48.07 .05	30.57 -.01	20.17 .62	47.63 .60	33.74 .10	38.76 -.01	42.59 .45	21.61 .21
June 8.4	48.02 .07	30.54 .03	19.46 .74	46.90 .85	33.62 .14	38.74 .03	43.13 .62	21.32 .36
18.3	47.94 .09	30.50 .05	18.65 .86	45.93 1.07	33.46 .17	38.70 .05	43.84 .76	20.88 .50
28.3	47.84 -.11	30.43 -.08	17.75 -.94	44.77 -1.24	33.27 -.19	38.64 -.07	44.70 +.91	20.31 -.63
July 8.3	47.71 .13	30.35 .10	16.78 .99	43.45 1.39	33.07 .21	38.55 .09	45.67 1.03	19.62 .74
18.3	47.57 .14	30.24 .11	15.78 1.01	41.98 1.52	32.85 .22	38.45 .11	46.76 1.11	18.84 .83
28.2	47.42 -.15	30.12 -.12	14.76 -1.02	40.40 -1.63	32.62 -.23	38.33 -.12	47.90 +1.15	17.97 -.90

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
FOR THE UPPER TRANSIT AT WASHINGTON.

Mean Solar Date.	33 Bootis.	47 Cephei, S. P.	$\gamma$ Scorpii.	$\delta$ Bootis.	$\rho$ Octantis.	$\beta$ Cor. Bor.	$\gamma$ Camelop., S. P.	$\delta$ Apodis.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	14 35	14 52	14 58	15 11	15 19	15 23	15 39	16 5
Mar. 30.6	5.51+.20	28.42-.47	8.91+.22	26.18+.22	60.26+1.78	40.05+.23	35.28-.39	14.31+1.12
Apr. 9.6	5.69 .15	28.05 .27	9.12 .19	26.38 .18	61.91 1.51	40.26 .19	34.96 .26	15.37 .99
19.5	5.80 .10	27.88-.06	9.30 .16	26.54 .14	63.28 1.22	40.43 .15	34.77 .13	16.29 .86
29.5	5.88 .06	27.92+.16	9.44 .13	26.65 .10	64.34 .91	40.56 .12	34.70 -.01	17.08 .71
May 9.5	5.92+.02	28.18 .38	9.55 .10	26.74 .07	65.08 .59	40.66 .09	34.76+.12	17.71 .56
19.5	5.91-.03	28.68+.59	9.63+.07	26.79+.03	65.51+.26	40.73+.06	34.94+.25	18.20+.40
29.4	5.84 .08	29.36 .76	9.69+.04	26.80-.01	65.59-.08	40.77+.02	35.26 .38	18.51 .22
June 8.4	5.75 .12	30.20 .91	9.71-.00	26.78 .04	65.34 .41	40.76-.01	35.70 .49	18.64+.04
18.4	5.61 .15	31.19 1.06	9.69-.03	26.72 .07	64.76 .73	40.72 .05	36.24 .58	18.59-.14
28.3	5.47 .18	32.33 1.18	9.66 .06	26.63 .11	63.88 1.03	40.65 .09	36.86 .66	18.37 .31
July 8.3	5.28-.20	33.56+1.26	9.58-.09	26.51-.14	62.70-1.30	40.55-.12	37.57+.74	17.97-.46
18.3	5.07 .22	34.85 1.31	9.49 .11	26.35 .16	61.29 1.53	40.41 .14	38.34 .79	17.44 .60
28.3	4.85 .24	36.17 1.33	9.37 .13	26.19 .18	59.64 1.71	40.26 .16	39.14 .81	16.77 .72
Aug. 7.2	4.60 .24	37.51 1.38	9.22 .15	26.00 .19	57.87 1.80	40.09 .18	39.96 .82	15.99 .82
17.2	4.36 .24	38.81 1.29	9.08 .16	25.80 .20	56.04 1.84	39.90 .19	40.79 .83	15.12 .90
27.2	4.13-.23	40.09+1.25	8.91-.17	25.60-.20	54.19-1.84	39.71-.19	41.60+.82	14.20-.93
Mean Solar Date.	$\phi$ Herculis.	$\sigma$ Cor. Bor. (mean.)	$\gamma$ Apodis.	$\eta$ Urs. Min.	$\eta$ Ophiuchi.	$\pi$ Herculis.	$\theta$ Ophiuchi.	$\delta$ Aræ.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	16 5	16 10	16 17	16 20	17 4	17 11	17 15	17 21
Apr. 9.6	35.70+.25	54.00+.24	58.26+1.05	32.23+.61	34.36+.30	31.83+.30	47.51+.33	57.90+.56
19.6	35.93 .21	54.22 .20	59.25 .92	32.79 .49	34.64 .26	32.11 .27	47.82 .28	58.43 .51
29.6	36.12 .16	54.40 .16	60.11 .78	33.21 .35	34.88 .23	32.36 .23	48.08 .25	58.91 .46
May 9.6	36.26 .12	54.54 .13	60.81 .64	33.49 .20	35.11 .20	32.57 .20	48.33 .22	59.34 .40
19.5	36.37 .08	54.66 .10	61.37 .48	33.61+.04	35.30 .17	32.75 .16	48.55 .20	59.71 .35
29.5	36.42+.03	54.73+.06	61.74+.30	33.57-.11	35.48+.14	32.89+.12	48.75+.17	60.04+.29
June 8.5	36.43-.02	54.77+.02	61.94+.12	33.38 .26	35.60 .11	32.98 .08	48.89 .14	60.29 .22
18.4	36.39 .06	54.77-.02	61.95-.07	33.05 .40	35.71 .08	33.04+.04	49.02 .11	60.47 .14
28.4	36.30 .11	54.72 .06	61.79 .25	32.57 .54	35.77+.04	33.05-.01	49.09 .07	60.57+.06
July 8.4	36.16 .15	54.64 .10	61.44 .42	31.98 .65	35.79 .00	33.01 .05	49.14+.03	60.59-.02
18.4	35.99-.19	54.52-.14	60.94-.58	31.26-.76	35.78-.03	32.93-.10	49.13-.02	60.55-.09
28.3	35.79 .22	54.36 .17	60.28 .71	30.47 .83	35.72 .07	32.80 .14	49.08 .07	60.42 .16
Aug. 7.3	35.56 .24	54.18 .19	59.51 .82	29.60 .90	35.64 .10	32.63 .18	49.00 .12	60.23 .22
17.3	35.30 .26	53.98 .21	58.63 .91	28.67 .95	35.51 .13	32.44 .21	48.86 .14	59.97 .28
27.3	35.02 .27	53.76 .22	57.70 .95	27.71 .96	35.36 .15	32.22 .23	48.72 .15	59.66 .32
Sept. 6.2	34.75-.27	53.54-.22	56.74-.95	26.74-.97	35.21-.17	31.98-.23	48.55-.17	59.32-.34
16.2	34.48 .26	53.32 .22	55.80 .91	25.77 .93	35.03 .17	31.75 .24	48.36 .18	58.97 .36
26.2	34.22 .24	53.10 .23	54.93 .83	24.89 .86	34.86 .16	31.50 .24	48.19 .18	58.60 .36
Oct. 6.1	33.99-.21	52.86-.23	54.14-.71	24.05-.76	34.71-.15	31.27-.23	48.02-.17	58.27-.33

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Mean Solar Date.	Groombr. 944, S.P.	ε Herculis.	θ Herculis.	ο Herculis.	λ Sagittarii.	χ Draconis.	ζ Pavonis.	γ Lyrae.
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	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	355 9 17 29	43 56 17 36	52 44 17 52	61 15 18 3	115 29 18 21	17 19 18 22	161 31 18 31	57 27 18 55
May 19.6	15.48- .43	38.22 +.21	48.16 +.22	36.74 +.20	44.31 +.25	56.57 +.41	15.17 +.64	10.37 +.26
29.6	15.28+ .03	38.40 .15	48.35 .16	36.93 .17	44.55 .23	56.94 .31	15.78 .57	10.61 .23
June 8.5	15.54 .49	38.51 .09	48.48 .12	37.10 .14	44.77 .20	57.19 .19	16.32 .47	10.83 .20
18.5	16.26 .94	38.58 +.04	48.58 .08	37.20 .10	44.96 .16	57.31 +.06	16.72 .36	11.00 .16
28.5	17.42 1.37	38.60 -.01	48.63 +.03	37.28 .06	45.09 .12	57.31 -.07	17.04 .24	11.11 +.11
July 8.4	19.00+1.76	38.56 -.06	48.65 -.01	37.32 +.02	45.20 +.08	57.17 -.19	17.21 +.12	11.20 +.06
18.4	20.94 .28	38.47 .12	48.60 .06	37.31 -.03	45.25 +.03	56.92 .31	17.28 .00	11.24 +.01
28.4	23.17 2.38	38.32 .17	48.52 .11	37.25 .07	45.25 -.01	56.55 .42	17.21 -.13	11.22 -.03
Aug. 7.4	25.71 2.63	38.13 .21	48.37 .16	37.15 .11	45.22 .05	56.07 .52	17.02 .24	11.17 .07
17.3	28.47 2.83	37.91 .24	48.20 .19	37.01 .15	45.14 .09	55.51 .61	16.72 .35	11.06 .12
27.3	31.36+2.98	37.65 -.27	48.00 -.21	36.84 -.18	45.01 -.13	54.84 -.69	16.31 -.45	10.90 -.16
Sept. 6.3	34.41 3.07	37.37 .28	47.78 .23	36.65 .20	44.85 .17	54.13 .74	15.82 .52	10.73 .19
16.3	37.50 3.09	37.08 .29	47.53 .25	36.44 .21	44.69 .18	53.37 .77	15.26 .57	10.52 .20
26.2	40.59 3.05	36.78 .29	47.28 .25	36.22 .22	44.50 .19	52.58 .80	14.68 .59	10.30 .21
Oct. 6.2	43.60 2.98	36.49 .28	47.03 .25	36.01 .21	44.32 .18	51.78 .80	14.08 .59	10.07 .22
16.2	46.54+2.86	36.22 -.27	46.79 -.24	35.80 -.20	44.15 -.16	50.99 -.77	13.50 -.57	9.85 -.22
Mean Solar Date.	ε Lyrae.	25 Camelop. S. P.	θ Lyrae.	β Cygni.	β Sagittae.	δ Cygni.	Groombr. 1374, S.P.	ε Pavonis.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	54 4 19 3	352 36 19 9	52 3 19 12	62 15 19 26	72 46 19 36	45 7 19 41	344 11 19 48	163 11 19 48
May 29.6	42.61 +.23	39.37- .64	52.38 +.28	39.32 +.25	31.01 +.26	49.87 +.28	1.31- .57	55.90 +.77
June 8.6	42.84 .20	38.87 .36	52.61 .22	39.55 .22	31.25 .23	50.14 .25	1.00 .25	56.64 .69
18.6	43.02 .15	38.65- .08	52.80 .16	39.77 .18	31.46 .19	50.38 .21	0.82- .12	57.28 .59
28.5	43.14 .10	38.72+ .21	52.93 .11	39.93 .13	31.64 .15	50.56 .16	0.76+ .01	57.83 .48
July 8.5	43.24 .05	39.08 .49	53.04 .06	40.04 .09	31.77 .11	50.68 .11	0.85 .14	58.24 .56
18.5	43.27 +.01	39.71+ .77	53.08 +.02	40.12 +.05	31.86 +.07	50.76 +.05	1.05+ .27	58.54 +.22
28.4	43.26 -.04	40.62 1.02	53.08 -.02	40.14 .00	31.91 +.03	50.76 -.01	1.37 .39	58.68 +.07
Aug. 7.4	43.20 .08	41.75 1.24	53.03 .07	40.13 -.04	31.92 -.02	50.73 .06	1.83 .50	58.69 -.07
17.4	43.09 .12	43.08 1.46	52.92 .12	40.06 .08	31.88 .06	50.63 .12	2.37 .60	58.54 .20
27.4	42.94 .16	44.63 1.65	52.76 .17	39.95 .12	31.79 .10	50.49 .17	3.03 .70	58.28 .32
Sept. 6.3	42.76 -.19	46.37+1.79	52.57 -.20	39.79 -.15	31.68 -.13	50.29 -.21	3.79+ .79	57.89 -.44
16.3	42.55 .22	48.22 1.90	52.36 .22	39.63 .18	31.53 .16	50.06 .24	4.60 .86	57.39 .52
26.3	42.31 .24	50.18 1.99	52.12 .24	39.43 .20	31.36 .17	49.82 .26	5.50 .92	56.82 .60
Oct. 6.3	42.07 .24	52.20 2.04	51.87 .24	39.22 .21	31.18 .18	49.54 .27	6.45 .96	56.18 .65
16.2	41.84 .23	54.27 2.04	51.63 .24	39.02 .20	31.00 .18	49.27 .28	7.42 .98	55.51 .66
26.2	41.60 -.22	56.28+2.01	51.39 -.23	38.82 -.19	30.82 -.17	48.99 -.28	8.40+ .99	54.86 -.65
Nov. 5.2	41.40 -.20	58.28+1.98	51.17 -.21	38.63 -.17	30.66 -.15	48.71 -.27	9.40+1.00	54.22 -.63

APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
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Mean Solar Date.	$\gamma$ Sagittæ.	$\epsilon$ Sagittarii.	$\theta$ Aquilæ.	$\zeta$ Cygni.	$\alpha$ Delphini.	$\beta$ Pavonis.	$\psi$ Capricor.	$\epsilon$ Cygni.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	70 47 19 54	118 0 19 56	91 7 20 6	43 34 20 10	74 27 20 34	156 34 20 35	115 38 20 40	56 25 20 42
June 18.6	16.58 +.21	27.50 +.26	6.08 +.23	28.23 +.22	57.27 +.25	53.34 +.52	7.41 +.28	8.10 +.26
28.6	16.77 .17	27.74 .22	6.28 .19	28.44 .19	57.49 .21	53.84 .46	7.67 .25	8.34 .22
July 8.6	16.92 .13	27.94 .17	6.47 .14	28.62 .15	57.69 .17	54.25 .38	7.91 .21	8.55 .17
18.5	17.03 .09	28.08 .12	6.59 .10	28.72 .09	57.83 .12	54.59 .29	8.10 .17	8.69 .12
28.5	17.09 +.05	28.18 .07	6.68 .06	28.77 +.03	57.93 .08	54.83 .19	8.23 .12	8.79 .08
Aug. 7.5	17.12 .00	28.23 +.02	6.73 +.02	28.77 -.03	58.00 +.04	54.94 +.08	8.32 +.07	8.85 +.04
17.4	17.09 -.05	28.23 -.03	6.73 -.02	28.71 .09	58.02 .00	54.96 -.02	8.36 +.02	8.85 -.01
27.4	17.02 -.09	28.18 .07	6.69 .06	28.58 .14	58.00 -.04	54.89 .13	8.35 -.02	8.82 .06
Sept. 6.4	16.92 .13	28.09 .11	6.61 .09	28.42 .18	57.93 .08	54.70 .23	8.30 .06	8.73 .11
16.4	16.78 .16	27.95 .15	6.51 .12	28.21 .22	57.83 .12	54.42 .31	8.22 .10	8.59 .15
26.3	16.61 -.17	27.79 -.17	6.36 -.14	27.97 -.23	57.69 -.15	54.08 -.38	8.08 -.14	8.43 -.17
Oct. 6.3	16.43 .18	27.63 .18	6.21 .15	27.70 .27	57.54 .16	53.66 .43	7.93 .16	8.25 .19
16.3	16.26 .18	27.44 .18	6.06 .16	27.43 .28	57.38 .17	53.21 .45	7.76 .17	8.05 .20
26.2	16.07 .18	27.26 .17	5.90 .16	27.15 .28	57.21 .16	52.75 .46	7.59 .17	7.85 .20
Nov. 5.2	15.90 .16	27.09 .15	5.74 .14	26.87 .27	57.05 .15	52.29 .45	7.42 .16	7.64 .19
15.2	15.75 -.13	26.96 -.12	5.62 -.11	26.62 -.24	56.90 -.13	51.85 -.41	7.27 -.14	7.45 -.18
25.2	15.66 -.09	26.84 -.09	5.52 -.08	26.38 -.21	56.78 -.09	51.47 -.34	7.14 -.10	7.27 -.16
Mean Solar Date.	$\tau$ Cygni.	$\zeta$ Capricor.	$\eta$ Cygni.	$\lambda^1$ Octantis.	$\zeta$ Chamæle- ontis, S.P.	$\pi^2$ Cygni.	$\iota$ Pegasi.	$\pi$ Pegasi.
	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "
	h m s	h m s	h m s	h m s	h m s	h m s	h m s	h m s
	52 23 21 10	112 51 21 20	50 3 21 32	173 11 21 35	189 31 21 36	41 10 21 43	64 33 21 48	57 19 22 5
July 8.6	46.58 +.23	54.91 +.24	54.98 +.25	34.68 +1.33	45.27-.81	4.80 +.28	28.63 +.25	30.73 +.27
18.6	46.78 .17	55.13 .20	55.20 .20	35.91 1.09	44.55 .66	5.05 .22	28.86 .20	30.98 .22
28.5	46.91 .12	55.31 .15	55.37 .14	36.87 .81	44.00 .47	5.24 .16	29.04 .15	31.18 .17
Aug. 7.5	47.00 .07	55.43 .10	55.48 .08	37.53 .49	43.70-.24	5.37 .09	29.16 .11	31.32 .12
17.5	47.04 +.02	55.51 .05	55.54 +.02	37.85+ .15	43.58 .00	5.43 +.05	29.26 .07	31.43 .08
27.5	47.02 -.03	55.54 +.01	55.55 -.03	37.83-.19	43.69+ .24	5.44 -.02	29.30 +.02	31.49 +.04
Sept. 6.4	46.96 .08	55.53 -.03	55.51 .07	37.48 .52	44.07 .48	5.41 .07	29.30 -.02	31.50 -.01
16.4	46.85 .12	55.49 .07	55.42 .11	36.78 .84	44.65 .70	5.32 .12	29.25 .06	31.47 .05
26.4	46.70 .16	55.39 .11	55.29 .15	35.79 1.12	45.41 .90	5.15 .16	29.18 .10	31.40 .09
Oct. 6.4	46.52 .18	55.26 .14	55.12 .17	34.54 1.36	46.41 1.08	4.96 .20	29.06 .13	31.29 .13
16.3	46.33 -.20	55.12 -.15	54.94 -.19	33.06-1.55	47.57+1.23	4.74 -.22	28.93 -.15	31.15 -.15
26.3	46.12 .21	54.96 .16	54.73 .20	31.44 1.68	48.86 1.32	4.51 .24	28.77 .16	30.99 .16
Nov. 5.3	45.92 .21	54.80 .16	54.53 .21	29.70 1.74	50.22 1.38	4.26 .25	28.61 .16	30.83 .17
15.2	45.71 .20	54.65 .15	54.31 .20	27.96 1.73	51.62 1.40	4.00 .26	28.45 .15	30.65 .17
25.2	45.52 .19	54.52 .14	54.12 .19	26.25 1.66	53.02 1.37	3.74 .25	28.30 .14	30.48 .16
Dec. 5.2	45.34 -.18	54.40 -.12	53.92 -.19	24.65-1.53	54.34+1.26	3.50 -.24	28.18 -.12	30.32 -.15

**APPROXIMATE NORTH POLAR DISTANCES AND APPARENT RIGHT ASCENSIONS,  
FOR THE UPPER TRANSIT AT WASHINGTON.**

Mean Solar Date.	$\nu$ Octantis.	$\gamma$ Aquarii.	$\sigma$ Aquarii.	$\alpha$ Lacertæ.	$\iota\sigma$ Lacertæ.	$\beta$ Octantis.	$\lambda$ Pegasi.	Groombr. 1706, S.P.
	° ' /	° ' /	° ' /	° ' /	° ' /	° ' /	° ' /	° ' /
	176 29 h m 22 12	91 54 h m 22 16	101 12 h m 22 25	40 15 h m 22 27	51 29 h m 22 34	171 55 h m 22 35	66 58 h m 22 41	348 19 h m 22 51
July 8.6	37.88+2.95	26.83 +.27	18.58 +.27	8.52 +.34	44.25 +.30	50.60+1.41	40.30 +.27	49.36- .67
18.6	40.57 2.44	27.08 .22	18.83 .24	8.83 .29	44.53 .26	51.90 1.22	40.56 .23	48.75 .54
28.6	42.76 1.92	27.28 .18	19.05 .20	9.09 .23	44.77 .22	53.03 1.00	40.80 .21	48.27 .41
Aug. 7.6	44.41 1.36	27.45 .14	19.23 .16	9.29 .17	44.96 .17	53.91 .76	41 98 .17	47.93 .28
17.5	45.47 .74	27.57 .10	19.36 .11	9.41 .11	45.10 .12	54.55 .50	41.12 .12	47.71- .15
27.5	45.89+ .09	27.65 +.06	19.45 +.07	9.49 +.05	45.19 +.07	54.91+ .23	41.22 +.08	47.64 .00
Sept. 6.5	45.64- .58	27.69 +.02	19.50 +.03	9.52 .00	45.23 +.02	55.00- .06	41.29 +.04	47.71+ .15
16.4	44.73 1.21	27.69 -.02	19.51 -.01	9.49 -.05	45.23 -.02	54.78 .36	41.30 .00	47.96 .31
26.4	43.21 1.81	27.65 .05	19.48 .05	9.41 .10	45.19 .07	54.28 .63	41.28 -.04	48.37 .46
Oct. 6.4	41.11 2.36	27.58 .08	19.42 .08	9.27 .15	45.10 .11	53.52 .87	41 22 .07	48.92 .60
16.4	38.49-2.82	27.50 -.10	19.34 -.10	9.10 -.18	44.97 -.13	52.54-1.08	41.14 -.10	49.61+ .75
26.3	35.47 3.17	27.39 .12	19.22 .11	8.91 .20	44.84 .15	51.35 1.26	41.03 .12	50.47 .90
Nov. 5.3	32 14 3.40	27.26 .13	19.10 .12	8.69 .22	44.68 .17	50.02 1.38	40.90 .13	51.42 1.03
15.3	28.66 3.51	27.13 .12	18.97 .13	8.45 .24	44.49 .18	48.58 1.46	40.77 .14	52.48 1.12
25.3	25.13 3.48	27.01 .12	18.84 .12	8.20 .24	44.32 .18	47.10 1.47	40.62 .14	53.65 1.18
Dec. 5.2	21.70-3.31	26.89 -.11	18.72 -.11	7.96 -.23	44.13 -.18	45.64-1.43	40.49 -.13	54.85+1.22
15.2	18.51-3.04	26.80 -.09	18.61 -.10	7.73 -.22	43.95 -.17	44.24-1.35	40.37 -.12	56.08+1.23
Mean Solar Date.	$\sigma$ Androm.	$\phi$ Aquarii.	$\tau$ Pegasi.	$\lambda$ Androm.	$\iota$ Aquarii.	$\delta$ Sculptoris.	$\gamma$ Octantis.	33 Piscium.
	° ' /	° ' /	° ' /	° ' /	° ' /	° ' /	° ' /	° ' /
	48 13 h m 22 57	96 36 h m 23 9	66 49 h m 23 15	44 6 h m 23 32	108 51 h m 23 38	118 42 h m 23 43	172 35 h m 23 46	96 17 h m 24 0
July 28.6	17.34 +.24	6.29 +.23	38.95 +.24	38.01 +.31	58.55 +.28	40.75 +.28	17.75+1.37	10.48 +.25
Aug. 7.6	17.56 .20	6.50 .20	39.17 .20	38.29 .25	58.80 .23	41.01 .24	19.05 1.20	10.72 .23
17.6	17.74 .16	6.68 .16	39.35 .16	38.51 .20	59.00 .18	41.23 .20	20.16 .98	10.95 .20
27.5	17.86 .11	6.80 .11	39.48 .12	38.69 .15	59.17 .14	41.41 .15	21.00 .70	11.12 .16
Sept. 6.5	17.93 +.05	6.89 .07	39.57 .07	38.81 .10	59.29 .10	41.54 .10	21.56 .41	11.25 .12
16.5	17.95 .00	6.94 +.03	39.62 +.03	38.89 +.05	59.38 +.06	41.63 +.06	21.81+ .20	11.35 +.08
26.5	17.94 -.04	6.95 .00	39.65 .00	38.92 .00	59.42 +.02	41.67 +.02	21.76- .21	11.42 .05
Oct. 6.4	17.88 .08	6.94 -.03	39.62 -.03	38.90 -.04	59.42 -.01	41.68 -.02	21.39 .51	11.45 +.02
16.4	17.77 .12	6.89 .06	39.58 .07	38.84 .08	59.39 .05	41.64 .05	20.73 .80	11.44 -.01
26.4	17.64 .15	6.81 .09	39.49 .09	38.75 .12	59.33 .08	41.57 .08	19.78 1.07	11.41 .04
Nov. 5.3	17.49 -.17	6.71 -.11	39.39 -.10	38.61 -.15	59.24 -.10	41.47 -.10	18.59-1.29	11.35 -.07
15.3	17.31 .18	6.60 .11	39.28 .11	38.46 .17	59.14 .11	41.36 .12	17.20 1.46	11.27 .09
25.3	17.13 .18	6.49 .12	39.15 .12	38.27 .18	59.02 .12	41.23 .14	15.67 1.57	11.18 .10
Dec. 5.3	16.94 .19	6.37 .11	39.03 .13	38.08 .19	58.90 .12	41.07 .15	14.05 1.64	11.08 .11
15.2	16.76 .18	6.26 .10	38.90 .13	37.89 .20	58.78 .12	40.93 .14	12.39 1.65	10.97 .11
25.2	16.59 -.18	6.17 -.09	38.77 -.12	37.69 -.20	58.66 -.12	40.80 -.13	10.75-1.59	10.87 -.10
35.2	16.40 -.18	6.09 -.07	38.66 -.11	37.49 -.19	58.55 -.11	40.67 -.13	9.21-1.45	10.76 -.10



## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
Jan. 1	18 49 29.82	30.56	-22 57 56.1	55.3	11.031	+13.05	+ 4 1.36	16 18.37	1 11.03	18 45 28.55
2	18 53 54.33	55.14	22 52 29.5	28.5	11.014	14.18	4 29.31	16 18.37	1 10.97	18 49 25.11
3	18 58 18.44	19.35	22 46 35.7	34.4	10.996	15.31	4 56.88	16 18.37	1 10.91	18 53 21.67
4	19 2 42.15	43.14	22 40 14.7	13.3	10.978	16.44	5 24.04	16 18.36	1 10.85	18 57 18.23
5	19 7 5.42	6.49	22 33 26.9	25.3	10.960	17.56	5 50.75	16 18.35	1 10.80	19 1 14.78
6	19 11 28.22	29.37	-22 26 12.5	10.5	10.941	+18.66	+ 6 16.98	16 18.32	1 10.74	19 5 11.34
7	19 15 50.54	51.76	22 18 31.5	29.3	10.920	19.76	6 42.75	16 18.29	1 10.68	19 9 7.90
8	19 20 12.33	13.62	22 10 24.2	21.8	10.898	20.85	7 7.98	16 18.25	1 10.62	19 13 4.46
9	19 24 33.59	34.95	22 1 51.0	48.3	10.875	21.94	7 32.70	16 18.21	1 10.54	19 17 1.02
10	19 28 54.30	55.73	21 52 51.9	48.9	10.851	23.01	7 56.85	16 18.17	1 10.46	19 20 57.58
11	19 33 14.43	15.94	-21 43 27.2	23.9	10.827	+24.06	+ 8 20.44	16 18.12	1 10.38	19 24 54.13
12	19 37 33.97	35.55	21 33 37.2	33.6	10.801	25.11	8 43.42	16 18.06	1 10.30	19 28 50.69
13	19 41 52.91	54.54	21 23 22.1	18.2	10.775	26.15	9 5.80	16 17.99	1 10.21	19 32 47.25
14	19 46 11.21	12.91	21 12 42.4	38.1	10.749	27.18	9 27.55	16 17.92	1 10.12	19 36 43.81
15	19 50 28.88	30.63	21 1 38.0	33.4	10.722	28.20	9 48.65	16 17.85	1 10.03	19 40 40.36
16	19 54 45.87	47.67	-20 50 9.6	4.7	10.694	+29.19	+10 9.08	16 17.77	1 9.94	19 44 36.92
17	19 59 2.18	4.04	20 38 17.3	12.0	10.665	30.18	10 28.84	16 17.68	1 9.84	19 48 33.48
18	20 3 17.77	19.69	20 25 61.4	55.8	10.635	31.17	10 47.89	16 17.59	1 9.74	19 52 30.03
19	20 7 32.67	34.63	20 13 22.4	16.5	10.604	32.11	11 6.22	16 17.50	1 9.64	19 56 26.59
20	20 11 46.81	48.82	20 0 20.6	14.4	10.573	33.06	11 23.80	16 17.40	1 9.54	20 0 23.15
21	20 16 0.21	2.27	-19 46 56.3	49.7	10.542	+33.99	+11 40.63	16 17.30	1 9.44	20 4 19.71
22	20 20 12.85	14.94	19 33 9.9	2.9	10.510	34.91	11 56.72	16 17.20	1 9.33	20 8 16.26
23	20 24 24.70	26.83	19 18 61.7	54.4	10.477	35.80	12 12.01	16 17.09	1 9.22	20 12 12.82
24	20 28 35.75	37.90	19 4 32.3	24.7	10.444	36.68	12 26.49	16 16.98	1 9.11	20 16 9.38
25	20 32 45.99	48.19	18 49 42.0	34.1	10.410	37.53	12 40.19	16 16.86	1 9.00	20 20 5.93
26	20 36 55.42	57.64	-18 34 31.6	23.4	10.376	+38.38	+12 53.06	16 16.74	1 8.89	20 24 2.49
27	20 41 4.01	6.27	18 18 60.2	51.7	10.341	39.22	13 5.10	16 16.62	1 8.78	20 27 59.05
28	20 45 11.78	14.06	18 3 9.5	0.6	10.307	40.03	13 16.31	16 16.50	1 8.66	20 31 55.60
29	20 49 18.72	21.02	17 46 59.6	50.5	10.272	40.82	13 26.66	16 16.37	1 8.55	20 35 52.16
30	20 53 24.81	27.13	17 30 30.8	21.4	10.237	41.60	13 36.18	16 16.24	1 8.44	20 39 48.72
31	20 57 30.06	32.40	-17 13 43.4	33.7	10.202	+42.36	+13 44.87	16 16.10	1 8.32	20 43 45.27
Feb. 1	21 1 34.47	36.82	16 56 37.7	27.7	10.167	43.10	13 52.72	16 15.96	1 8.21	20 47 41.83
2	21 5 38.04	40.42	16 39 15.0	4.7	10.132	43.83	13 59.72	16 15.81	1 8.09	20 51 38.39
3	21 9 40.81	43.18	16 21 34.5	24.0	10.097	44.55	14 5.92	16 15.66	1 7.97	20 55 34.94
4	21 13 42.70	45.08	16 3 37.2	26.4	10.063	45.24	14 11.26	16 15.51	1 7.86	20 59 31.50
5	21 17 43.79	46.17	-15 45 23.3	12.4	10.029	+45.92	+14 15.81	16 15.34	1 7.74	21 3 28.05
6	21 21 44.10	46.48	15 26 53.3	42.2	9.995	46.58	14 19.53	16 15.17	1 7.63	21 7 24.61
7	21 25 43.58	45.97	15 7 67.6	56.3	9.962	47.23	14 22.45	16 15.00	1 7.52	21 11 21.16
8	21 29 42.28	44.66	14 48 66.5	55.0	9.929	47.85	14 24.58	16 14.82	1 7.41	21 15 17.72
9	21 33 40.20	42.58	14 29 50.4	38.7	9.897	48.47	14 25.94	16 14.63	1 7.30	21 19 14.27
10	21 37 37.34	39.72	-14 10 19.9	8.0	9.865	+49.07	+14 26.51	16 14.44	1 7.19	21 23 10.83
11	21 41 33.73	36.10	13 50 35.0	23.0	9.834	49.66	14 26.34	16 14.25	1 7.08	21 27 7.39
12	21 45 29.37	31.74	13 30 36.4	24.3	9.803	50.22	14 25.42	16 14.06	1 6.97	21 31 3.94
13	21 49 24.27	26.63	13 10 24.5	12.3	9.773	50.77	14 23.76	16 13.86	1 6.86	21 35 0.49
14	21 53 18.46	20.79	12 49 59.7	47.3	9.743	51.30	14 21.38	16 13.66	1 6.75	21 38 57.05
15	21 57 11.92	14.23	-12 29 22.2	9.8	9.713	+51.81	+14 18.28	16 13.45	1 6.65	21 42 53.61
16	22 1 4.69	6.98	-12 8 32.8	20.3	9.684	+52.31	+14 14.50	16 13.23	1 6.55	21 46 50.16

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.19 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	"	"	m s	' "	m s	h m s
Feb. 16	22 1 4.69	6.98	-12 8 32.8	20.3	9.684	+52.31	+14 14.50	16 13.23	1 6.55	21 46 50.16
17	22 4 56.77	59.06	11 47 31.6	19.1	9.655	52.78	14 10.00	16 13.02	1 6.45	21 50 46.71
18	22 8 48.17	50.43	11 26 19.1	6.6	9.627	53.24	14 4.82	16 12.80	1 6.35	21 54 43.27
19	22 12 38.88	41.12	11 4 55.9	43.3	9.599	53.68	13 58.99	16 12.58	1 6.25	21 58 39.82
20	22 16 28.93	31.15	10 43 22.2	9.6	9.572	54.11	13 52.47	16 12.36	1 6.15	22 2 36.38
21	22 20 18.34	20.53	-10 21 38.7	26.1	9.545	+54.51	+13 45.33	16 12.14	1 6.06	22 6 32.93
22	22 24 7.11	9.27	9 59 45.6	33.1	9.519	54.90	13 37.52	16 11.92	1 5.97	22 10 29.49
23	22 27 55.25	57.39	9 37 43.7	31.2	9.493	55.26	13 29.11	16 11.69	1 5.88	22 14 26.04
24	22 31 42.77	44.88	9 15 33.0	20.5	9.468	55.61	13 20.08	16 11.47	1 5.80	22 18 22.59
25	22 35 29.70	31.78	8 53 13.9	1.6	9.443	55.95	13 10.45	16 11.24	1 5.72	22 22 19.15
26	22 39 16.05	18.10	-8 30 47.3	35.0	9.419	+56.26	+13 0.24	16 11.01	1 5.64	22 26 15.70
27	22 43 1.82	3.84	8 8 13.2	1.0	9.396	56.56	12 49.45	16 10.78	1 5.56	22 30 12.25
28	22 46 47.04	49.02	7 45 32.1	20.0	9.372	56.85	12 38.11	16 10.55	1 5.48	22 34 8.81
Mar. 1	22 50 31.73	33.67	7 22 44.5	32.6	9.351	57.11	12 26.25	16 10.31	1 5.41	22 38 5.36
2	22 54 15.89	17.80	6 59 50.7	38.9	9.330	57.36	12 13.84	16 10.07	1 5.34	22 42 1.92
3	22 57 59.56	61.43	-6 36 51.1	39.5	9.309	+57.60	+12 0.98	16 9.83	1 5.27	22 45 58.47
4	23 1 42.75	44.59	6 13 46.1	34.6	9.290	57.82	11 47.62	16 9.59	1 5.20	22 49 55.02
5	23 5 25.50	27.30	5 50 35.8	24.6	9.272	58.02	11 33.80	16 9.34	1 5.14	22 53 51.58
6	23 9 7.81	9.57	5 27 21.1	10.0	9.255	58.21	11 19.56	16 9.08	1 5.08	22 57 48.13
7	23 12 49.72	51.43	5 3 61.9	51.0	9.239	58.39	11 4.91	16 8.82	1 5.02	23 1 44.68
8	23 16 31.23	32.91	-4 40 38.8	28.1	9.223	+58.54	+10 49.85	16 8.56	1 4.96	23 5 41.24
9	23 20 12.38	14.01	4 17 11.9	1.5	9.208	58.69	10 34.46	16 8.30	1 4.90	23 9 37.79
10	23 23 53.20	54.79	3 53 41.9	31.7	9.194	58.82	10 18.74	16 8.04	1 4.85	23 13 34.34
11	23 27 33.69	35.24	3 29 68.8	58.8	9.181	58.93	10 2.67	16 7.78	1 4.81	23 17 30.90
12	23 31 13.90	15.40	3 6 33.3	23.6	9.170	59.03	9 46.33	16 7.51	1 4.77	23 21 27.45
13	23 34 53.83	55.29	-2 42 55.4	46.0	9.159	+59.11	+9 29.72	16 7.24	1 4.73	23 25 24.00
14	23 38 33.52	34.94	2 19 15.8	6.6	9.149	59.18	9 12.85	16 6.97	1 4.69	23 29 20.56
15	23 42 12.98	14.35	1 55 34.7	25.7	9.140	59.24	8 55.76	16 6.69	1 4.65	23 33 17.11
16	23 45 52.24	53.56	1 31 52.3	43.7	9.132	59.27	8 38.47	16 6.42	1 4.62	23 37 13.66
17	23 49 31.32	32.60	1 8 9.4	1.0	9.125	59.29	8 21.00	16 6.14	1 4.59	23 41 10.21
18	23 53 10.21	11.44	-0 44 26.2	18.1	9.118	+59.30	+8 3.34	16 5.86	1 4.56	23 45 6.77
19	23 56 48.97	50.15	-0 20 42.8	35.1	9.112	59.30	7 45.55	16 5.58	1 4.54	23 49 3.32
20	0 0 27.59	28.73	+0 3 0.0	7.5	9.107	59.27	7 27.61	16 5.30	1 4.52	23 52 59.87
21	0 4 6.09	7.19	0 26 42.0	49.1	9.103	59.23	7 9.57	16 5.03	1 4.50	23 56 56.43
22	0 7 44.50	45.55	0 50 22.7	29.6	9.099	59.17	6 51.43	16 4.75	1 4.49	0 0 52.98
23	0 11 22.84	23.85	+1 14 1.9	8.4	9.096	+59.09	+6 33.23	16 4.48	1 4.48	0 4 49.53
24	0 15 1.10	2.06	1 37 39.0	45.3	9.094	59.00	6 14.94	16 4.20	1 4.48	0 8 46.09
25	0 18 39.32	40.23	2 1 13.9	19.8	9.092	58.89	5 56.61	16 3.93	1 4.48	0 12 42.64
26	0 22 17.52	18.38	2 24 46.0	51.6	9.091	58.77	5 38.26	16 3.66	1 4.48	0 16 39.19
27	0 25 55.70	56.52	2 48 14.9	20.2	9.091	58.63	5 19.88	16 3.39	1 4.48	0 20 35.75
28	0 29 33.88	34.65	+3 11 40.4	45.3	9.091	+58.48	+5 1.51	16 3.12	1 4.48	0 24 32.30
29	0 33 12.08	12.81	3 35 2.1	6.7	9.092	58.31	4 43.18	16 2.85	1 4.49	0 28 28.85
30	0 36 50.33	51.01	3 58 19.5	23.8	9.095	58.13	4 24.87	16 2.58	1 4.50	0 32 25.41
31	0 40 28.65	29.28	4 21 32.5	36.5	9.098	57.94	4 6.64	16 2.31	1 4.51	0 36 21.96
32	0 44 7.05	7.63	4 44 40.7	44.4	9.102	57.73	3 48.49	16 2.04	1 4.53	0 40 18.51
33	0 47 45.54	46.08	+5 7 43.7	47.1	9.107	+57.51	+3 30.44	16 1.76	1 4.55	0 44 15.07
34	0 51 24.16	24.66	+5 30 41.2	44.3	9.112	+57.28	+3 12.50	16 1.49	1 4.57	0 48 11.62

NOTE.—For mean time interval of semidiameter passing meridian subtract 0.18 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
Apr. 1	0 44 7.05	7.63	+ 4 44 40.7	44.4	9.102	+57.73	+3 48.49	16 2.04	1 4.53	0 40 18.51
2	0 47 45.54	46.08	5 7 43.7	47.1	9.107	57.51	3 30.44	16 1.76	1 4.55	0 44 15.07
3	0 51 24.16	24.66	5 30 41.2	44.3	9.112	57.28	3 12.50	16 1.49	1 4.57	0 48 11.62
4	0 55 2.93	3.38	5 53 32.8	35.6	9.118	57.03	2 54.73	16 1.22	1 4.60	0 52 8.17
5	0 58 41.86	42.27	6 16 18.3	20.8	9.126	56.76	2 37.12	16 0.95	1 4.63	0 56 4.73
6	1 2 20.99	21.36	+ 6 38 57.3	59.6	9.135	+56.49	+2 19.69	16 0.67	1 4.66	1 0 1.28
7	1 6 0.32	0.64	7 1 29.6	31.6	9.144	56.20	2 2.48	16 0.40	1 4.69	1 3 57.83
8	1 9 39.89	40.17	7 23 54.9	56.6	9.154	55.90	1 45.48	16 0.12	1 4.72	1 7 54.39
9	1 13 19.70	19.94	7 46 12.6	14.0	9.165	55.58	1 28.75	15 59.84	1 4.76	1 11 50.94
10	1 16 59.80	59.99	8 8 22.8	23.9	9.177	55.25	1 12.30	15 59.56	1 4.80	1 15 47.49
11	1 20 40.19	40.34	+ 8 30 24.8	25.7	9.190	+54.91	+0 56.14	15 59.28	1 4.84	1 19 44.05
12	1 24 20.88	21.00	8 52 18.4	19.1	9.203	54.55	0 40.29	15 59.01	1 4.88	1 23 40.60
13	1 28 1.92	1.99	9 14 3.3	3.7	9.217	54.18	0 24.78	15 58.73	1 4.93	1 27 37.15
14	1 31 43.30	43.33	9 35 39.2	39.4	9.232	53.79	+0 9.60	15 58.46	1 4.98	1 31 33.71
15	1 35 25.04	25.04	9 57 5.5	5.5	9.247	53.39	-0 5.20	15 58.19	1 5.03	1 35 30.26
16	1 39 7.16	7.12	+10 18 22.1	21.9	9.263	+52.98	-0 19.64	15 57.92	1 5.08	1 39 26.82
17	1 42 49.68	49.60	10 39 28.6	28.2	9.280	52.55	0 33.67	15 57.65	1 5.14	1 43 23.37
18	1 46 32.60	32.48	11 0 24.6	23.9	9.297	52.11	0 47.31	15 57.38	1 5.20	1 47 19.93
19	1 50 15.92	15.77	11 21 9.7	8.9	9.314	51.65	1 0.53	15 57.12	1 5.26	1 51 16.48
20	1 53 59.68	59.49	11 41 43.8	42.8	9.332	51.17	1 13.34	15 56.86	1 5.32	1 55 13.03
21	1 57 43.86	43.65	+12 2 6.1	5.0	9.350	+50.68	-1 25.71	15 56.60	1 5.38	1 59 9.59
22	2 1 28.50	28.25	12 22 16.7	15.4	9.369	50.18	1 37.62	15 56.35	1 5.45	2 3 6.14
23	2 5 13.57	13.29	12 42 15.0	13.5	9.388	49.66	1 49.10	15 56.10	1 5.51	2 7 2.70
24	2 8 59.11	58.80	13 1 60.7	59.1	9.407	49.13	2 0.11	15 55.85	1 5.58	2 10 59.25
25	2 12 45.12	44.78	13 21 33.5	31.7	9.427	48.58	2 10.66	15 55.60	1 5.65	2 14 55.81
26	2 16 31.60	31.24	+13 40 53.0	51.1	9.447	+48.03	-2 20.74	15 55.36	1 5.72	2 18 52.36
27	2 20 18.56	18.17	13 59 59.0	57.0	9.467	47.46	2 30.33	15 55.12	1 5.79	2 22 48.92
28	2 24 6.01	5.60	14 18 51.0	48.9	9.487	46.87	2 39.42	15 54.88	1 5.87	2 26 45.47
29	2 27 53.97	53.53	14 37 28.9	26.7	9.508	46.27	2 48.02	15 54.65	1 5.95	2 30 42.03
30	2 31 42.43	41.97	14 55 52.3	50.0	9.530	45.66	2 56.11	15 54.42	1 6.03	2 34 38.58
May 1	2 35 31.41	30.93	+15 13 60.8	58.5	9.552	+45.04	-3 3.70	15 54.19	1 6.11	2 38 35.14
2	2 39 20.91	20.40	15 31 54.2	51.8	9.574	44.40	3 10.74	15 53.96	1 6.19	2 42 31.69
3	2 43 10.96	10.43	15 49 32.2	29.8	9.596	43.75	3 17.27	15 53.73	1 6.27	2 46 28.25
4	2 47 1.53	0.99	16 6 54.5	52.1	9.619	43.10	3 23.25	15 53.50	1 6.35	2 50 24.81
5	2 50 52.67	52.11	16 23 60.9	58.5	9.642	42.43	3 28.66	15 53.27	1 6.43	2 54 21.36
6	2 54 44.38	43.81	+16 40 51.0	48.5	9.666	+41.74	-3 33.52	15 53.05	1 6.52	2 58 17.92
7	2 58 36.65	36.06	16 57 24.5	22.0	9.690	41.04	3 37.80	15 52.82	1 6.60	3 2 14.47
8	3 2 29.49	28.89	17 13 41.1	38.6	9.714	40.34	3 41.51	15 52.60	1 6.68	3 6 11.03
9	3 6 22.92	22.32	17 29 40.6	38.1	9.738	39.62	3 44.64	15 52.38	1 6.76	3 10 7.58
10	3 10 16.93	16.32	17 45 22.7	20.2	9.762	38.89	3 47.18	15 52.16	1 6.84	3 14 4.14
11	3 14 11.54	10.92	+18 0 46.9	44.5	9.787	+38.14	-3 49.13	15 51.95	1 6.92	3 18 0.70
12	3 18 6.75	6.12	18 15 53.2	50.7	9.812	37.38	3 50.49	15 51.74	1 7.00	3 21 57.25
13	3 22 2.53	1.90	18 30 41.1	38.7	9.837	36.61	3 51.26	15 51.53	1 7.08	3 25 53.81
14	3 25 58.94	58.29	18 45 10.4	8.1	9.862	35.82	3 51.43	15 51.33	1 7.16	3 29 50.37
15	3 29 55.91	55.27	18 59 20.8	18.5	9.886	35.03	3 51.00	15 51.12	1 7.24	3 33 46.92
16	3 33 53.46	52.83	+19 13 12.0	9.7	9.910	+34.23	-3 50.00	15 50.92	1 7.32	3 37 43.48
17	3 37 51.60	50.97	+19 26 43.7	41.5	9.934	+33.41	-3 48.42	15 50.72	1 7.40	3 41 40.03

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.18 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
May 17	3 37 51.60	50.97	+19 26 43.7	41.5	9.934	+33.41	-3 48.42	15 50.72	1 7.40	3 41 40.03
18	3 41 50.32	49.69	19 39 55.5	53.4	9.958	32.58	3 46.27	15 50.53	1 7.48	3 45 36.59
19	3 45 49.59	48.96	19 52 47.3	45.3	9.981	31.74	3 43.55	15 50.34	1 7.56	3 49 33.15
20	3 49 49.41	48.80	20 5 18.8	16.9	10.004	30.89	3 40.29	15 50.16	1 7.64	3 53 29.71
21	3 53 49.79	49.18	20 17 29.8	27.9	10.026	30.02	3 36.47	15 49.98	1 7.71	3 57 26.26
22	3 57 50.68	50.09	+20 29 19.8	18.1	10.048	+29.15	-3 32.13	15 49.81	1 7.78	4 1 22.82
23	4 1 52.09	51.51	20 40 48.9	47.2	10.069	28.27	3 27.29	15 49.65	1 7.85	4 5 19.38
24	4 5 54.01	53.44	20 51 56.5	54.9	10.090	27.38	3 21.92	15 49.49	1 7.92	4 9 15.93
25	4 9 56.42	55.86	21 2 42.7	41.2	10.110	26.47	3 16.07	15 49.33	1 7.99	4 13 12.49
26	4 13 59.30	58.76	21 13 7.0	5.6	10.130	25.55	3 9.76	15 49.17	1 8.06	4 17 9.05
27	4 18 2.64	2.12	+21 23 9.3	8.0	10.149	+24.63	-3 2.98	15 49.02	1 8.13	4 21 5.61
28	4 22 6.42	5.92	21 32 49.5	48.3	10.167	23.71	2 55.75	15 48.88	1 8.19	4 25 2.16
29	4 26 10.65	10.17	21 42 7.3	6.1	10.185	22.78	2 48.09	15 48.74	1 8.25	4 28 58.72
30	4 30 15.29	14.83	21 51 2.4	1.4	10.202	21.83	2 39.99	15 48.60	1 8.31	4 32 55.28
31	4 34 20.35	19.91	21 59 34.9	34.0	10.218	20.87	2 31.50	15 48.46	1 8.37	4 36 51.84
June 1	4 38 25.79	25.38	+22 7 44.3	43.4	10.234	+19.91	-2 22.61	15 48.33	1 8.43	4 40 48.39
2	4 42 31.62	31.24	22 15 30.9	30.1	10.250	18.95	2 13.34	15 48.20	1 8.49	4 44 44.95
3	4 46 37.82	37.46	22 22 54.0	53.3	10.265	17.98	2 3.70	15 48.08	1 8.54	4 48 41.51
4	4 50 44.38	44.05	22 29 53.8	53.2	10.280	17.00	1 53.70	15 47.95	1 8.59	4 52 38.07
5	4 54 51.28	50.98	22 36 29.9	29.4	10.294	16.01	1 43.34	15 47.83	1 8.64	4 56 34.62
6	4 58 58.50	58.23	+22 42 42.4	42.0	10.308	+15.02	-1 32.68	15 47.71	1 8.68	5 0 31.18
7	5 3 6.04	5.80	22 48 31.0	30.7	10.321	14.02	1 21.71	15 47.60	1 8.72	5 4 27.74
8	5 7 13.87	13.66	22 53 55.6	55.4	10.332	13.02	1 10.43	15 47.49	1 8.76	5 8 24.30
9	5 11 21.97	21.79	22 58 56.3	56.1	10.343	12.01	0 58.89	15 47.38	1 8.79	5 12 20.86
10	5 15 30.35	30.20	23 3 32.6	32.4	10.353	11.00	0 47.07	15 47.27	1 8.82	5 16 17.41
11	5 19 38.95	38.84	+23 7 44.6	44.5	10.363	+9.99	-0 35.03	15 47.17	1 8.85	5 20 13.97
12	5 23 47.77	47.70	23 11 32.2	32.1	10.372	8.97	0 22.76	15 47.07	1 8.87	5 24 10.53
13	5 27 56.79	56.76	23 14 55.3	55.2	10.379	7.95	-0 10.29	15 46.98	1 8.89	5 28 7.09
14	5 32 5.98	5.98	23 17 53.7	53.7	10.386	6.92	+0 2.34	15 46.89	1 8.91	5 32 3.65
15	5 36 15.33	15.37	23 20 27.5	27.5	10.392	5.89	0 15.12	15 46.80	1 8.92	5 36 0.21
16	5 40 24.79	24.86	+23 22 36.5	36.5	10.396	+4.86	+0 28.03	15 46.73	1 8.93	5 39 56.76
17	5 44 34.34	34.45	23 24 20.8	20.8	10.398	3.83	0 41.04	15 46.66	1 8.94	5 43 53.32
18	5 48 43.95	44.10	23 25 40.3	40.3	10.400	2.80	0 54.09	15 46.59	1 8.95	5 47 49.88
19	5 52 53.62	53.80	23 26 35.0	35.0	10.402	1.76	1 7.19	15 46.53	1 8.96	5 51 46.44
20	5 57 3.30	3.52	23 27 4.9	4.9	10.403	+0.72	1 20.30	15 46.47	1 8.96	5 55 43.00
21	6 1 12.95	13.21	+23 27 9.9	9.9	10.402	-0.31	+1 33.41	15 46.42	1 8.96	5 59 39.55
22	6 5 22.56	22.86	23 26 50.1	50.1	10.399	1.34	1 46.46	15 46.38	1 8.95	6 3 36.11
23	6 9 32.11	32.45	23 26 5.6	5.6	10.396	2.37	1 59.45	15 46.34	1 8.94	6 7 32.67
24	6 13 41.55	41.92	23 24 56.2	56.1	10.391	3.40	2 12.33	15 46.30	1 8.93	6 11 29.23
25	6 17 50.86	51.27	23 23 22.2	22.0	10.385	4.43	2 25.09	15 46.28	1 8.92	6 15 25.79
26	6 22 0.04	0.48	+23 21 23.5	23.3	10.379	-5.46	+2 37.70	15 46.26	1 8.90	6 19 22.35
27	6 26 9.03	9.51	23 19 0.3	0.0	10.371	6.48	2 50.13	15 46.24	1 8.88	6 23 18.91
28	6 30 17.83	18.35	23 16 12.5	12.1	10.362	7.50	3 2.39	15 46.22	1 8.85	6 27 15.46
29	6 34 26.42	26.98	23 12 60.3	59.8	10.353	8.52	3 14.42	15 46.21	1 8.82	6 31 12.02
30	6 38 34.77	35.35	23 9 23.7	23.2	10.343	9.53	3 26.22	15 46.20	1 8.79	6 35 8.58
31	6 42 42.88	43.49	+23 5 22.9	22.3	10.332	-10.54	+3 37.77	15 46.19	1 8.76	6 39 5.14
32	6 46 50.70	51.35	+23 0 58.0	57.3	10.320	-11.54	+3 49.03	15 46.19	1 8.72	6 43 1.69

NOTE.—For mean time interval of semidiameter passing meridian subtract 0.19 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	°	"	m s	' "	m s	h m s
July 1	6 42 42.88	43.49	+23 5 22.9	22.3	10.332	-10.54	+3 37.77	15 46.19	1 8.76	6 39 5.14
2	6 46 50.70	51.35	23 0 58.0	57.3	10.320	11.54	3 49.03	15 46.19	1 8.72	6 43 1.69
3	6 50 58.24	58.92	22 56 9.0	8.2	10.308	12.54	4 0.01	15 46.19	1 8.68	6 46 58.25
4	6 55 5.47	6.19	22 50 55.9	55.0	10.295	13.54	4 10.69	15 46.20	1 8.64	6 50 54.81
5	6 59 12.39	13.15	22 45 19.0	18.0	10.281	14.53	4 21.04	15 46.21	1 8.59	6 54 51.37
6	7 3 18.97	19.74	+22 39 18.5	17.4	10.267	-15.51	+4 31.06	15 46.22	1 8.54	6 58 47.93
7	7 7 25.19	25.98	22 32 54.5	53.2	10.252	16.49	4 40.72	15 46.23	1 8.49	7 2 44.49
8	7 11 31.05	31.87	22 26 6.8	5.4	10.236	17.47	4 50.03	15 46.25	1 8.44	7 6 41.04
9	7 15 36.52	37.37	22 18 55.8	54.4	10.220	18.44	4 58.93	15 46.27	1 8.38	7 10 37.60
10	7 19 41.60	42.46	22 11 21.9	20.3	10.203	19.40	5 7.46	15 46.30	1 8.32	7 14 34.16
11	7 23 46.26	47.15	+22 3 24.8	23.1	10.185	-20.35	+5 15.56	15 46.33	1 8.26	7 18 30.72
12	7 27 50.50	51.41	21 55 5.0	3.2	10.167	21.30	5 23.25	15 46.36	1 8.20	7 22 27.27
13	7 31 54.28	55.21	21 46 22.6	20.6	10.148	22.23	5 30.47	15 46.40	1 8.13	7 26 23.83
14	7 35 57.60	58.54	21 37 17.9	15.8	10.128	23.16	5 37.24	15 46.44	1 8.06	7 30 20.39
15	7 40 0.45	1.41	21 27 50.8	48.6	10.108	24.08	5 43.51	15 46.49	1 7.99	7 34 16.95
16	7 44 2.81	3.79	+21 17 61.8	59.5	10.088	-24.99	+5 49.30	15 46.55	1 7.92	7 38 13.51
17	7 48 4.66	5.65	21 7 51.1	48.6	10.066	25.89	5 54.60	15 46.61	1 7.85	7 42 10.06
18	7 52 5.98	6.98	20 57 19.0	16.4	10.044	26.78	5 59.36	15 46.67	1 7.77	7 46 6.62
19	7 56 6.76	7.77	20 46 25.4	22.7	10.021	27.66	6 3.58	15 46.75	1 7.69	7 50 3.18
20	8 0 6.98	8.00	20 35 10.9	8.0	9.998	28.53	6 7.24	15 46.83	1 7.61	7 53 59.73
21	8 4 6.64	7.67	+20 23 35.7	32.7	9.974	-29.39	+6 10.34	15 46.91	1 7.53	7 57 56.29
22	8 8 5.73	6.76	20 11 39.9	36.9	9.950	30.24	6 12.87	15 47.00	1 7.45	8 1 52.85
23	8 12 4.22	5.25	19 59 24.1	20.9	9.925	31.07	6 14.80	15 47.09	1 7.37	8 5 49.41
24	8 16 2.11	3.14	19 46 48.2	44.9	9.900	31.90	6 16.14	15 47.19	1 7.29	8 9 45.96
25	8 19 59.39	60.42	19 33 52.6	49.2	9.874	32.71	6 16.86	15 47.29	1 7.21	8 13 42.52
26	8 23 56.07	57.11	+19 20 37.7	34.3	9.849	-33.51	+6 16.97	15 47.40	1 7.12	8 17 39.08
27	8 27 52.14	53.17	19 7 3.6	0.1	9.823	34.30	6 16.49	15 47.51	1 7.03	8 21 35.63
28	8 31 47.58	48.60	18 53 10.7	7.1	9.798	35.09	6 15.36	15 47.63	1 6.95	8 25 32.19
29	8 35 42.41	43.43	18 38 59.1	55.5	9.772	35.86	6 13.63	15 47.75	1 6.86	8 29 28.75
30	8 39 36.63	37.64	18 24 29.3	25.5	9.746	36.62	6 11.30	15 47.87	1 6.77	8 33 25.30
31	8 43 30.23	31.22	+18 9 41.4	37.6	9.720	-37.37	+6 8.34	15 47.99	1 6.68	8 37 21.86
Aug. 1	8 47 23.21	24.20	17 54 35.7	31.9	9.695	38.10	6 4.76	15 48.12	1 6.59	8 41 18.41
2	8 51 15.59	16.56	17 39 12.5	8.7	9.670	38.82	6 0.58	15 48.25	1 6.51	8 45 14.97
3	8 55 7.36	8.32	17 23 32.1	28.3	9.645	39.53	5 55.79	15 48.38	1 6.43	8 49 11.53
4	8 58 58.54	59.48	17 7 34.6	30.7	9.620	40.24	5 50.42	15 48.52	1 6.35	8 53 8.08
5	9 2 49.13	50.05	+16 51 20.4	16.5	9.596	-40.94	+5 44.45	15 48.65	1 6.26	8 57 4.64
6	9 6 39.13	40.03	16 34 49.8	45.9	9.572	41.62	5 37.90	15 48.79	1 6.17	9 1 1.19
7	9 10 28.56	29.44	16 17 63.1	59.2	9.548	42.28	5 30.76	15 48.93	1 6.08	9 4 57.75
8	9 14 17.42	18.28	16 0 60.4	56.6	9.524	42.93	5 23.06	15 49.08	1 6.00	9 8 54.31
9	9 18 5.71	6.54	15 43 42.4	38.6	9.501	43.57	5 14.80	15 49.23	1 5.91	9 12 50.86
10	9 21 53.44	54.26	+15 26 8.9	5.2	9.478	-44.20	+5 5.97	15 49.39	1 5.83	9 16 47.42
11	9 25 40.63	41.41	15 8 20.5	16.9	9.455	44.82	4 56.62	15 49.55	1 5.75	9 20 43.97
12	9 29 27.28	28.03	14 50 17.5	13.9	9.432	45.42	4 46.70	15 49.71	1 5.67	9 24 40.53
13	9 33 13.37	14.10	14 31 60.2	56.8	9.410	46.01	4 36.24	15 49.88	1 5.59	9 28 37.08
14	9 36 58.94	59.64	14 13 28.9	25.5	9.388	46.59	4 25.25	15 50.05	1 5.51	9 32 33.64
15	9 40 43.99	44.66	+13 54 44.0	40.7	9.366	-47.15	+4 13.75	15 50.23	1 5.44	9 36 30.19
16	9 44 28.51	29.14	+13 35 45.8	42.6	9.345	-47.70	+4 1.71	15 50.41	1 5.36	9 40 26.75

NOTE.—For mean time interval of semidiameter passing meridian subtract 0.19 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
Aug. 16	9 44 28.51	29.14	+13 35 45.8	42.6	9.345	-47.70	+ 4 1.71	15 50.41	1 5.36	9 40 26.75
17	9 48 12.52	13.12	13 16 34.5	31.5	9.324	48.23	3 49.18	15 50.59	1 5.29	9 44 23.30
18	9 51 56.03	56.60	12 57 10.6	7.7	9.303	48.75	3 36.12	15 50.78	1 5.22	9 48 19.86
19	9 55 39.04	39.57	12 37 34.6	31.8	9.282	49.25	3 22.59	15 50.97	1 5.15	9 52 16.41
20	9 59 21.56	22.06	12 17 46.5	44.0	9.262	49.74	3 8.55	15 51.17	1 5.08	9 56 12.97
21	10 3 3.59	4.05	+11 57 46.8	44.4	9.242	-50.22	+ 2 54.04	15 51.37	1 5.01	10 0 9.52
22	10 6 45.17	45.59	11 37 35.8	33.6	9.223	50.69	2 39.04	15 51.58	1 4.94	10 4 6.08
23	10 10 26.28	26.66	11 17 13.8	11.8	9.204	51.14	2 23.61	15 51.79	1 4.88	10 8 2.63
24	10 14 6.94	7.27	10 56 41.4	39.6	9.185	51.57	2 7.72	15 52.01	1 4.82	10 11 59.19
25	10 17 47.17	47.47	10 35 58.7	57.1	9.167	51.99	1 51.40	15 52.23	1 4.76	10 15 55.74
26	10 21 26.99	27.24	+10 15 5.6	4.3	9.151	-52.41	+ 1 34.66	15 52.45	1 4.70	10 19 52.29
27	10 25 6.40	6.61	9 54 3.0	1.9	9.135	52.81	1 17.52	15 52.67	1 4.65	10 23 48.85
28	10 28 45.43	45.59	9 32 51.1	50.2	9.119	53.19	1 0.01	15 52.89	1 4.60	10 27 45.40
29	10 32 24.09	24.21	9 11 30.2	29.5	9.104	53.55	0 42.12	15 53.11	1 4.55	10 31 41.95
30	10 36 2.41	2.48	8 50 0.5	0.1	9.090	53.91	0 23.88	15 53.34	1 4.50	10 35 38.51
31	10 39 40.40	40.42	+ 8 28 22.2	22.1	9.076	-54.26	+ 0 5.33	15 53.57	1 4.45	10 39 35.06
Sept. 1	10 43 18.08	18.06	8 6 35.7	35.9	9.064	54.60	- 0 13.55	15 53.80	1 4.40	10 43 31.62
2	10 46 55.48	55.41	7 44 41.5	41.9	9.053	54.92	0 32.68	15 54.03	1 4.36	10 47 28.17
3	10 50 32.60	32.48	7 22 39.5	40.3	9.042	55.23	0 52.11	15 54.26	1 4.32	10 51 24.72
4	10 54 9.49	9.32	7 0 30.3	31.4	9.032	55.53	1 11.77	15 54.49	1 4.28	10 55 21.28
5	10 57 46.14	45.92	+ 6 38 14.2	15.6	9.023	-55.81	- 1 31.67	15 54.73	1 4.25	10 59 17.83
6	11 1 22.61	22.34	6 15 51.4	53.1	9.016	56.08	1 51.75	15 54.97	1 4.22	11 3 14.38
7	11 4 58.88	58.56	5 53 22.2	24.2	9.009	56.34	2 12.04	15 55.21	1 4.19	11 7 10.94
8	11 8 34.99	34.61	5 30 47.0	49.3	9.002	56.59	2 32.47	15 55.45	1 4.17	11 11 7.49
9	11 12 10.94	10.52	5 8 6.1	8.7	8.996	56.82	2 53.06	15 55.69	1 4.15	11 15 4.04
10	11 15 46.78	46.31	+ 4 45 19.8	22.8	8.991	-57.03	- 3 13.77	15 55.93	1 4.13	11 19 0.60
11	11 19 22.51	21.99	4 22 28.5	31.9	8.987	57.23	3 34.60	15 56.18	1 4.11	11 22 57.15
12	11 22 58.14	57.57	3 59 32.6	36.3	8.983	57.42	3 55.50	15 56.43	1 4.09	11 26 53.70
13	11 26 33.69	33.07	3 36 32.3	36.4	8.981	57.59	4 16.50	15 56.68	1 4.08	11 30 50.26
14	11 30 9.20	8.52	3 13 28.2	32.6	8.979	57.75	4 37.55	15 56.94	1 4.07	11 34 46.81
15	11 33 44.65	43.92	+ 2 50 20.3	25.1	8.977	-57.89	- 4 58.64	15 57.20	1 4.06	11 38 43.36
16	11 37 20.10	19.31	2 27 9.3	14.4	8.976	58.01	5 19.75	15 57.46	1 4.06	11 42 39.91
17	11 40 55.52	54.68	2 3 55.4	60.9	8.976	58.13	5 40.87	15 57.73	1 4.06	11 46 36.47
18	11 44 30.95	30.06	1 40 38.9	44.7	8.977	58.23	6 1.98	15 58.00	1 4.06	11 50 33.02
19	11 48 6.41	5.47	1 17 20.3	26.5	8.978	58.31	6 23.07	15 58.27	1 4.07	11 54 29.57
20	11 51 41.91	40.91	+ 0 54 0.0	6.5	8.981	-58.38	- 6 44.11	15 58.54	1 4.08	11 58 26.13
21	11 55 17.45	16.40	0 30 38.1	45.0	8.984	58.43	7 5.11	15 58.81	1 4.09	12 2 22.68
22	11 58 53.10	52.00	+ 0 7 15.2	22.4	8.987	58.47	7 26.01	15 59.08	1 4.11	12 6 19.23
23	12 2 28.83	27.68	- 0 16 8.5	0.9	8.992	58.49	7 46.84	15 59.36	1 4.13	12 10 15.79
24	12 6 4.69	3.49	0 39 32.7	24.8	8.997	58.50	8 7.52	15 59.64	1 4.15	12 14 12.34
25	12 9 40.68	39.42	- 1 2 57.0	48.8	9.003	-58.51	- 8 28.08	15 59.92	1 4.18	12 18 8.89
26	12 13 16.84	15.53	1 26 21.0	12.5	9.011	58.49	8 48.49	16 0.20	1 4.21	12 22 5.45
27	12 16 53.18	51.81	1 49 44.6	35.7	9.019	58.46	9 8.68	16 0.47	1 4.24	12 26 2.00
28	12 20 29.71	28.30	2 12 67.3	58.1	9.027	58.42	9 28.70	16 0.75	1 4.27	12 29 58.55
29	12 24 6.49	5.02	2 36 28.8	19.3	9.037	58.36	9 48.47	16 1.03	1 4.31	12 33 55.10
30	12 27 43.52	42.00	- 2 59 48.7	38.9	9.049	-58.29	-10 7.99	16 1.31	1 4.35	12 37 51.66
31	12 31 20.82	19.25	- 3 22 66.8	56.7	9.061	-58.21	-10 27.23	16 1.58	1 4.39	12 41 48.21

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.18 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
Oct. 1	12 31 20.82	19.25	- 3 22 66.8	56.7	9.061	-58.21	-10 27.23	16 1.58	1 4.39	12 41 48.21
2	12 34 58.44	56.82	3 46 22.5	12.2	9.074	58.11	10 46.17	16 1.86	1 4.44	12 45 44.76
3	12 38 36.37	34.71	4 9 36.0	25.3	9.088	57.99	11 4.79	16 2.13	1 4.49	12 49 41.32
4	12 42 14.67	12.95	4 32 46.4	35.5	9.103	57.86	11 23.04	16 2.40	1 4.54	12 53 37.87
5	12 45 53.32	51.56	4 55 53.6	42.4	9.119	57.73	11 40.94	16 2.67	1 4.59	12 57 34.42
6	12 49 32.37	30.56	- 5 18 57.6	46.2	9.136	-57.58	-11 58.44	16 2.95	1 4.65	13 1 30.97
7	12 53 11.85	9.99	5 41 57.4	45.7	9.154	57.41	12 15.53	16 3.22	1 4.71	13 5 27.53
8	12 56 51.76	49.85	6 4 52.8	40.9	9.172	57.23	12 32.16	16 3.49	1 4.77	13 9 24.08
9	13 0 32.13	30.18	6 27 43.7	31.6	9.192	57.01	12 48.36	16 3.76	1 4.83	13 13 20.63
10	13 4 12.97	10.97	6 50 29.5	17.2	9.212	56.79	13 4.07	16 4.03	1 4.90	13 17 17.19
11	13 7 54.31	52.26	- 7 12 69.8	57.3	9.233	-56.56	-13 19.28	16 4.30	1 4.97	13 21 13.74
12	13 11 36.14	34.06	7 35 44.3	31.6	9.255	56.31	13 33.99	16 4.57	1 5.05	13 25 10.29
13	13 15 18.52	16.39	7 57 72.5	59.6	9.277	56.04	13 48.19	16 4.84	1 5.13	13 29 6.85
14	13 18 61.43	59.26	8 20 34.1	21.1	9.300	55.75	14 1.83	16 5.11	1 5.21	13 33 3.40
15	13 22 44.89	42.68	8 42 48.5	35.4	9.323	55.45	14 14.92	16 5.39	1 5.29	13 36 59.96
16	13 26 28.93	26.68	- 9 4 55.6	42.4	9.347	-55.13	-14 27.45	16 5.66	1 5.37	13 40 56.51
17	13 30 13.56	11.25	9 26 54.8	41.5	9.371	54.80	14 39.39	16 5.94	1 5.46	13 44 53.06
18	13 33 58.75	56.43	9 48 45.7	32.3	9.397	54.45	14 50.74	16 6.22	1 5.55	13 48 49.62
19	13 37 44.58	42.22	10 10 28.0	14.4	9.423	54.08	15 1.47	16 6.49	1 5.64	13 52 46.17
20	13 41 31.01	28.63	10 31 61.1	47.5	9.449	53.69	15 11.61	16 6.77	1 5.73	13 56 42.73
21	13 45 18.10	15.68	-10 53 24.8	11.1	9.476	-53.28	-15 21.07	16 7.04	1 5.83	14 0 39.28
22	13 49 5.82	3.37	11 14 38.6	24.9	9.503	52.85	15 29.91	16 7.31	1 5.93	14 4 35.83
23	13 52 54.21	51.73	11 35 42.2	28.5	9.531	52.41	15 38.08	16 7.58	1 6.03	14 8 32.39
24	13 56 43.29	40.78	11 56 35.2	21.5	9.559	51.97	15 45.55	16 7.85	1 6.13	14 12 28.94
25	14 0 33.05	30.52	12 17 17.1	3.5	9.588	51.51	15 52.35	16 8.12	1 6.23	14 16 25.49
26	14 4 23.53	20.97	-12 37 47.8	34.2	9.618	-51.03	-15 58.44	16 8.39	1 6.33	14 20 22.05
27	14 8 14.72	12.14	12 57 66.6	53.1	9.649	50.53	16 3.80	16 8.65	1 6.44	14 24 18.61
28	14 12 6.66	4.06	13 17 73.1	59.7	9.680	50.01	16 8.43	16 8.91	1 6.55	14 28 15.16
29	14 15 59.36	56.74	13 37 67.2	53.8	9.712	49.48	16 12.29	16 9.16	1 6.66	14 32 11.71
30	14 19 52.83	50.19	13 57 48.2	35.0	9.744	48.93	16 15.39	16 9.41	1 6.77	14 36 8.27
31	14 23 47.08	44.42	-14 17 16.1	3.0	9.777	-48.37	-16 17.70	16 9.66	1 6.89	14 40 4.82
Nov. 1	14 27 42.14	39.47	14 36 30.2	17.2	9.811	47.79	16 19.22	16 9.91	1 7.00	14 44 1.38
2	14 31 38.00	35.32	14 55 30.2	17.4	9.845	47.20	16 19.91	16 10.15	1 7.11	14 47 57.93
3	14 35 34.68	32.00	15 14 15.6	2.9	9.879	46.58	16 19.79	16 10.39	1 7.23	14 51 54.49
4	14 39 32.21	29.51	15 32 46.2	33.7	9.914	45.95	16 18.82	16 10.63	1 7.34	14 55 51.04
5	14 43 30.59	27.89	-15 50 61.4	49.1	9.950	-45.30	-16 17.01	16 10.87	1 7.46	14 59 47.60
6	14 47 29.80	27.10	16 8 60.9	48.8	9.986	44.64	16 14.36	16 11.10	1 7.58	15 3 44.15
7	14 51 29.88	27.18	16 26 44.4	32.5	10.021	43.96	16 10.84	16 11.33	1 7.70	15 7 40.71
8	14 55 30.83	28.13	16 43 71.0	59.4	10.057	43.26	16 6.47	16 11.55	1 7.82	15 11 37.27
9	14 59 32.62	29.93	17 1 20.9	9.5	10.093	42.55	16 1.23	16 11.78	1 7.94	15 15 33.82
10	15 3 35.29	32.61	-17 18 13.2	2.1	10.129	-41.82	-15 55.14	16 12.00	1 8.06	15 19 30.38
11	15 7 38.82	36.14	17 34 47.8	37.0	10.165	41.07	15 48.16	16 12.22	1 8.18	15 23 26.93
12	15 11 43.22	40.55	17 50 64.1	53.5	10.201	40.29	15 40.34	16 12.44	1 8.30	15 27 23.49
13	15 15 48.46	45.81	18 6 61.8	51.5	10.236	39.50	15 31.67	16 12.65	1 8.42	15 31 20.05
14	15 19 54.55	51.92	18 22 40.3	30.4	10.271	38.70	15 22.13	16 12.86	1 8.54	15 35 16.60
15	15 23 61.49	58.87	-18 37 59.5	49.9	10.306	-37.88	-15 11.76	16 13.07	1 8.65	15 39 13.16
16	15 28 9.26	6.67	18 52 58.9	49.6	10.341	-37.05	-15 0.55	16 13.28	1 8.77	15 43 9.71

NOTE.—For mean time interval of semidiameter passing meridian, subtract 0.18 from the sidereal interval.

## FOR WASHINGTON MEAN AND APPARENT NOON.

Date.	Apparent Right Ascension.		Apparent Declination.		Hourly Motion.		Equation of Time for Apparent Noon.	Semi-diameter at Apparent Noon.	Sidereal Time of Semid. Passing Meridian.	Sidereal Time of Mean Noon.
	Mean Noon.	App. Noon.	Mean Noon.	App. Noon.	Right Ascen.	Declination.				
	h m s	s	° ' "	"	s	"	m s	' "	m s	h m s
Nov. 16	15 28 9.26	6.67	-18 52 58.9	49.6	10.341	-37.05	-15 0.55	16 13.28	1 8.77	15 43 9.71
17	15 32 17.85	15.28	19 7 37.9	28.9	10.375	36.20	14 48.52	16 13.49	1 8.89	15 47 6.27
18	15 36 27.27	24.73	19 21 56.4	47.8	10.409	35.33	14 35.67	16 13.70	1 9.00	15 51 2.83
19	15 40 37.48	34.98	19 35 53.8	45.5	10.442	34.45	14 22.02	16 13.91	1 9.11	15 54 59.38
20	15 44 48.50	46.03	19 49 29.8	21.9	10.475	33.55	14 7.56	16 14.11	1 9.22	15 58 55.94
21	15 48 60.30	57.86	-20 2 44.2	36.6	10.508	-32.64	-13 52.34	16 14.31	1 9.33	16 2 52.50
22	15 53 12.87	10.47	20 15 36.5	29.2	10.540	31.71	13 36.32	16 14.50	1 9.44	16 6 49.05
23	15 57 26.21	23.85	20 27 66.4	59.5	10.572	30.77	13 19.54	16 14.69	1 9.55	16 10 45.61
24	16 1 40.31	38.00	20 40 13.5	7.0	10.603	29.81	13 2.00	16 14.87	1 9.65	16 14 42.17
25	16 5 55.15	52.89	20 51 57.5	51.3	10.633	28.84	12 43.72	16 15.05	1 9.75	16 18 38.73
26	16 10 10.72	8.51	-21 3 18.2	12.3	10.663	-27.87	-12 24.71	16 15.23	1 9.85	16 22 35.28
27	16 14 27.02	24.85	21 14 15.1	9.6	10.693	26.88	12 4.97	16 15.40	1 9.95	16 26 31.84
28	16 18 44.02	41.90	21 24 47.9	42.8	10.722	25.87	11 44.53	16 15.56	1 10.05	16 30 28.40
29	16 22 61.71	59.66	21 34 56.5	51.8	10.751	24.85	11 23.39	16 15.72	1 10.14	16 34 24.95
30	16 27 20.07	18.08	21 44 40.4	36.0	10.779	23.81	11 1.59	16 15.87	1 10.23	16 38 21.51
Dec. 1	16 31 39.11	37.18	-21 53 59.4	55.3	10.807	-22.76	-10 39.13	16 16.02	1 10.32	16 42 18.07
2	16 35 58.78	56.91	22 2 53.2	49.4	10.833	21.71	10 16.01	16 16.16	1 10.41	16 46 14.63
3	16 40 19.08	17.28	22 11 21.6	18.1	10.858	20.65	9 52.25	16 16.30	1 10.49	16 50 11.19
4	16 44 39.99	38.25	22 19 24.1	21.0	10.883	19.57	9 27.90	16 16.43	1 10.56	16 54 7.74
5	16 48 61.47	59.81	22 26 60.6	57.8	10.907	18.48	9 2.98	16 16.56	1 10.63	16 58 4.30
6	16 53 23.51	21.93	-22 34 10.9	8.3	10.930	-17.37	-8 37.49	16 16.68	1 10.70	17 2 0.86
7	16 57 46.09	44.58	22 40 54.7	52.5	10.951	16.26	8 11.47	16 16.80	1 10.76	17 5 57.42
8	17 2 9.16	7.72	22 47 11.8	9.9	10.971	15.15	7 44.93	16 16.91	1 10.82	17 9 53.97
9	17 6 32.71	31.36	22 53 2.1	0.4	10.990	14.03	7 17.95	16 17.02	1 10.88	17 13 50.53
10	17 10 56.70	55.43	22 58 25.2	23.7	11.008	12.90	6 50.50	16 17.13	1 10.93	17 17 47.09
11	17 15 21.10	19.91	-23 3 21.0	19.8	11.024	-11.75	-6 22.67	16 17.24	1 10.98	17 21 43.65
12	17 19 45.86	44.75	23 7 49.3	48.2	11.039	10.60	5 54.46	16 17.34	1 11.03	17 25 40.21
13	17 24 10.96	9.94	23 11 50.0	49.1	11.053	9.45	5 25.90	16 17.44	1 11.08	17 29 36.76
14	17 28 36.38	35.45	23 15 23.0	22.3	11.064	8.29	4 57.04	16 17.53	1 11.13	17 33 33.32
15	17 33 2.04	1.20	23 18 28.0	27.4	11.074	7.13	4 27.92	16 17.62	1 11.17	17 37 29.88
16	17 37 27.93	27.18	-23 21 5.1	4.7	11.083	-5.96	-3 58.58	16 17.71	1 11.19	17 41 26.44
17	17 41 54.01	53.35	23 23 14.2	13.9	11.090	4.79	3 29.05	16 17.79	1 11.21	17 45 23.00
18	17 46 20.25	19.68	23 24 55.1	54.9	11.096	3.62	2 59.35	16 17.87	1 11.23	17 49 19.55
19	17 50 46.60	46.12	23 26 7.9	7.8	11.100	2.45	2 29.55	16 17.94	1 11.25	17 53 16.11
20	17 55 13.02	12.63	23 26 52.4	52.4	11.102	1.27	1 59.68	16 18.01	1 11.26	17 57 12.67
21	17 59 39.50	39.21	-23 27 8.7	8.7	11.103	-0.09	-1 29.75	16 18.07	1 11.27	18 1 9.23
22	18 4 5.99	5.79	23 26 56.7	56.7	11.103	+ 1.08	0 59.81	16 18.13	1 11.27	18 5 5.79
23	18 8 32.47	32.35	23 26 16.6	16.6	11.102	2.26	0 29.89	16 18.19	1 11.27	18 9 2.35
24	18 12 58.88	58.87	23 25 8.1	8.1	11.099	3.44	- 0 0.04	16 18.24	1 11.26	18 12 58.91
25	18 17 25.21	25.29	23 23 31.4	31.3	11.095	4.62	+ 0 29.75	16 18.28	1 11.24	18 16 55.46
26	18 21 51.42	51.59	-23 21 26.6	26.5	11.089	+ 5.79	+ 0 59.41	16 18.32	1 11.22	18 20 52.02
27	18 26 17.48	17.74	23 18 53.7	53.5	11.082	6.96	1 28.93	16 18.34	1 11.20	18 24 48.58
28	18 30 43.37	43.72	23 15 52.8	52.5	11.074	8.12	1 58.27	16 18.36	1 11.18	18 28 45.14
29	18 35 9.07	9.51	23 12 23.7	23.3	11.066	9.29	2 27.41	16 18.38	1 11.15	18 32 41.70
30	18 39 34.54	35.06	23 8 26.9	26.4	11.056	10.45	2 56.34	16 18.39	1 11.12	18 36 38.25
31	18 43 59.74	60.35	-23 4 2.2	1.6	11.044	+11.61	+ 3 24.99	16 18.40	1 11.08	18 40 34.81
32	18 48 24.65	25.35	-22 59 10.0	9.1	11.031	+12.76	+ 3 53.36	16 18.40	1 11.03	18 44 31.37

NOTE.—For mean time interval of semidiameter passing meridian subtract 0.19 from the sidereal interval.



## MOON-CULMINATIONS, 1898.

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## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
Jan. 1	h m	m	h m s	s	° ' "	"	s	' "	' "	I. S.
2	7 22.71	1.883	2 9 23.99	123.13	+18 35 14.2	+597.8	64.92	14 52.5	54 28.6	I. S.
3	8 8.83	1.962	2 59 34.93	127.89	22 7 24.4	458.8	66.14	14 47.5	54 10.5	I. S.
4	8 56.87	2.040	3 51 42.22	132.61	24 38 59.1	295.3	67.32	14 45.1	54 1.6	I. S.
5	9 46.58	2.097	4 45 29.62	136.01	26 1 0.8	+112.3	68.13	14 44.9	54 1.0	I. S.
6	10 37.21	2.115	5 40 12.32	137.10	26 7 12.2	-81.6	68.35	14 46.7	54 7.6	I. N.
7	11 27.74	2.089	6 34 48.72	135.51	+24 55 45.3	-273.8	67.90	14 50.1	54 19.9	I. N.
8	12 17.19	2.028	7 28 20.27	131.84	22 30 8.4	-450.8	66.93	14 54.7	54 37.0	II. N.
9	13 4.94	1.951	8 20 9.79	127.23	18 58 29.9	-602.7	65.73	15 0.5	54 58.2	II. S.
10	13 50.87	1.879	9 10 9.93	122.94	14 31 59.6	-724.5	64.62	15 7.2	55 22.9	II. S.
11	14 35.34	1.831	9 58 41.82	120.00	9 23 12.9	-814.0	63.88	15 14.9	55 51.0	II. S.
12	15 19.06	1.819	10 46 28.58	119.28	+ 3 45 12.2	-870.5	63.75	15 23.5	56 22.7	II. S.
13	16 3.00	1.851	11 34 29.13	121.25	- 2 8 40.4	-892.9	64.35	15 33.1	56 57.8	II. S.
14	16 48.34	1.936	12 23 53.38	126.31	- 8 4 2.5	-877.0	65.76	15 43.6	57 36.4	II. S.
15	17 36.33	2.072	13 15 57.29	134.54	-13 44 14.1	-815.4	67.97	15 54.7	58 17.2	II. S.
16	18 28.19	2.255	14 11 53.74	145.54	-18 48 50.1	-697.1	70.78	16 6.0	58 58.6	II. S.
17	19 24.74	2.457	15 12 32.70	157.70	-22 52 58.2	-511.8	73.76	16 16.6	59 37.5	II. S.
18	20 25.90	2.629	16 17 48.86	167.99	-25 29 10.5	-258.8	76.17	16 25.4	60 10.0	II. S.
19	21 30.16	2.706	17 26 11.63	172.68	-26 13 42.7	+ 40.9	77.20	16 31.2	60 31.3	II. N.
20	22 34.77	2.657	18 34 55.61	169.70	-24 56 0.9	343.9	76.44	16 32.9	60 37.5	II. N.
21	23 36.86	2.505	19 41 7.71	160.54	-21 44 39.9	602.2	74.22	16 29.9	60 26.5	
22	0 34.65	2.309	20 43 0.87	148.78	-17 4 13.5	+786.7	71.33	16 22.2	59 58.4	
23	1 27.80	2.125	21 40 14.99	137.72	-11 25 57.0	892.2	68.55	16 10.8	59 16.3	I. S.
24	2 16.99	1.982	22 33 31.16	129.12	- 5 19 35.0	929.3	66.37	15 56.9	58 25.1	I. S.
25	3 3.36	1.891	23 23 57.84	123.62	+ 0 50 30.5	913.3	64.94	15 41.8	57 29.8	I. S.
26	3 48.15	1.849	0 12 48.73	121.12	6 45 42.8	857.0	64.34	15 27.1	56 35.8	I. S.
27	4 32.47	1.851	1 1 12.15	121.25	+12 11 55.1	+769.4	64.43	15 13.8	55 47.1	I. S.
28	5 17.30	1.889	1 50 5.86	123.53	16 57 50.2	656.0	65.08	15 2.8	55 6.5	I. S.
29	6 3.35	1.951	2 40 12.87	127.22	20 53 36.7	519.0	66.09	14 54.5	54 36.1	I. S.
30	6 51.00	2.020	3 31 56.30	131.39	23 50 6.5	359.9	67.17	14 49.2	54 16.7	I. S.
31	7 40.22	2.079	4 25 14.24	134.90	25 39 2.7	+181.9	68.05	14 46.9	54 8.2	I. S.
Feb. 1	8 30.54	2.109	5 19 38.22	136.73	+26 13 57.8	- 8.7	68.45	14 47.4	54 9.9	I. S.
2	9 21.15	2.102	6 14 19.58	136.31	25 31 38.7	-202.3	68.26	14 50.3	54 20.7	I. N.
3	10 11.15	2.060	7 8 24.33	133.77	23 33 14.0	-387.3	67.53	14 55.3	54 39.0	I. N.
4	10 59.84	1.996	8 1 10.47	129.98	20 24 22.7	-553.0	66.46	15 1.8	55 3.0	I. N.
5	11 46.93	1.909	8 52 19.77	125.90	16 14 29.9	-691.4	65.36	15 9.4	55 30.8	I. N.
6	12 32.54	1.876	9 42 0.70	122.74	+11 15 35.7	-797.4	64.49	15 17.5	56 0.6	II. S.
7	13 17.20	1.852	10 30 44.40	121.25	+ 5 41 15.0	-868.2	64.11	15 25.8	56 31.1	II. S.
8	14 1.72	1.865	11 19 19.04	122.05	- 0 13 51.3	-900.8	64.38	15 34.0	57 1.2	II. S.
9	14 47.07	1.922	12 8 44.14	125.50	- 6 13 55.2	-892.3	65.37	15 42.0	57 30.4	II. S.
10	15 34.35	2.026	13 0 5.37	131.72	-12 1 34.3	-837.8	67.09	15 49.6	57 58.4	II. S.
11	16 24.63	2.170	13 54 27.06	140.44	-17 17 13.3	-731.1	69.41	15 56.8	58 25.0	II. S.
12	17 18.72	2.339	14 52 37.88	150.57	-21 38 43.9	-566.4	72.00	16 3.5	58 49.6	II. S.
13	18 16.80	2.495	15 54 48.48	159.96	-24 42 30.4	-343.2	74.31	16 9.5	59 11.5	II. S.
14	19 18.00	2.592	17 0 7.31	165.77	-26 7 8.4	- 74.2	75.67	16 14.3	59 29.2	II. S.
15	20 20.40	2.591	18 6 37.97	165.74	-25 39 36.5	+211.5	75.61	16 17.2	59 40.0	II. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Feb. 15	20 20.40	2.591	18 6 37.97	165.74	-25 39 36.5	+211.5	75.61	16 17.2	59 40.0	II. N.
16	21 21.60	2.495	19 11 56.55	159.99	-23 20 44.1	476.3	74.16	16 17.8	59 42.2	II. N.
17	22 19.72	2.343	20 14 10.11	150.81	-19 25 36.9	688.8	71.85	16 15.5	59 33.5	II. N.
18	23 13.99	2.181	21 12 31.51	141.08	-14 18 38.5	834.4	69.35	16 10.0	59 13.3	
20	0 4.61	2.044	22 7 14.02	132.82	- 8 27 6.1	912.5	67.20	16 1.5	58 42.4	
21	0 52.42	1.948	22 59 6.84	127.03	- 2 16 36.2	+930.8	65.67	15 50.8	58 2.8	I. S.
22	1 38.45	1.896	23 49 12.76	123.91	+ 3 50 54.0	899.3	64.87	15 38.6	57 18.1	I. S.
23	2 23.75	1.885	0 38 34.48	123.29	9 37 24.0	827.2	64.77	15 26.1	56 32.2	I. S.
24	3 9.23	1.909	1 28 7.21	124.74	14 48 15.3	722.0	65.23	15 14.2	55 48.6	I. S.
25	3 55.59	1.957	2 18 33.51	127.62	19 11 21.3	589.2	66.07	15 4.0	55 10.8	I. S.
26	4 43.27	2.016	3 10 18.49	131.14	+22 36 29.6	+432.9	67.06	14 55.9	54 41.4	I. S.
27	5 32.31	2.068	4 3 25.40	134.29	24 55 10.7	257.8	67.91	14 50.7	54 22.0	I. S.
28	6 22.37	2.099	4 57 34.00	136.14	26 1 4.3	+ 70.2	68.40	14 48.4	54 13.8	I. S.
Mar. 1	7 12.81	2.099	5 52 5.15	136.12	25 50 45.3	-121.7	68.36	14 49.3	54 16.9	I. N. S.
2	8 2.85	2.067	6 46 12.49	134.22	24 24 23.1	-308.5	67.81	14 53.0	54 30.6	I. N.
3	8 51.86	2.014	7 39 17.27	131.04	+21 45 51.4	-481.2	66.91	14 59.3	54 53.8	I. N.
4	9 39.49	1.956	8 30 59.71	127.53	18 2 19.0	-632.4	65.89	15 7.7	55 24.6	I. N.
5	10 25.82	1.908	9 21 23.53	124.64	13 23 31.3	-756.6	65.06	15 17.5	56 0.6	I. N.
6	11 11.26	1.884	10 10 54.01	123.20	8 1 17.6	-848.8	64.61	15 28.0	56 39.1	I. N.
7	11 56.52	1.894	11 0 13.51	123.81	+ 2 9 27.1	-903.8	64.75	15 38.4	57 17.2	I. S.
8	12 42.49	1.944	11 50 16.11	126.85	- 3 55 59.9	-915.7	65.57	15 47.9	57 52.1	II. S.
9	13 30.19	2.037	12 42 2.35	132.43	- 9 56 32.8	-878.1	67.08	15 56.0	58 22.0	II. S.
10	14 20.59	2.168	13 36 31.40	140.32	-15 30 56.9	-784.0	69.18	16 2.4	58 45.4	II. S.
11	15 14.45	2.321	14 34 28.18	149.50	-20 15 38.7	-629.2	71.56	16 6.8	59 1.7	II. S.
12	16 11.93	2.463	15 36 2.74	158.07	-23 46 22.7	-415.4	73.72	16 9.4	59 11.4	II. S.
13	17 12.27	2.553	16 40 29.67	163.42	-25 41 53.3	-156.6	75.06	16 10.5	59 15.2	II. S.
14	18 13.75	2.555	17 46 5.13	163.56	-25 49 11.5	+120.2	75.10	16 10.0	59 13.6	II. S.
15	19 14.20	2.469	18 50 38.46	158.43	-24 7 53.9	381.0	73.85	16 8.3	59 7.2	II. N.
16	20 11.84	2.329	19 52 23.40	149.97	-20 50 12.0	598.6	71.72	16 5.2	58 55.8	II. N.
17	21 5.89	2.176	20 50 31.27	140.75	-16 16 38.8	759.1	69.33	16 0.7	58 39.3	II. N.
18	21 56.45	2.043	21 45 9.83	132.77	-10 50 48.3	+860.3	67.20	15 54.8	58 17.5	II. N.
19	22 44.26	1.948	22 37 2.74	127.05	- 4 55 42.6	906.3	65.63	15 47.4	57 50.3	II. N.
20	23 30.29	1.895	23 27 9.09	123.90	+ 1 7 42.1	902.8	64.75	15 38.8	57 18.7	
22	0 15.57	1.884	0 16 29.71	123.19	7 0 51.0	855.9	64.56	15 29.3	56 43.8	
23	1 1.00	1.907	1 5 59.33	124.58	12 27 21.9	770.5	64.95	15 19.4	56 7.7	I. S.
24	1 47.29	1.954	1 56 20.94	127.42	+17 12 49.9	+651.5	65.75	15 9.9	55 32.8	I. S.
25	2 34.88	2.012	2 48 0.61	130.92	21 4 43.7	503.6	66.75	15 1.5	55 1.7	I. S.
26	3 23.83	2.065	3 41 2.69	134.11	23 52 42.7	333.1	67.66	14 54.7	54 36.8	I. S.
27	4 13.84	2.097	4 35 7.71	136.02	25 29 12.4	+147.7	68.22	14 50.1	54 20.1	I. S.
28	5 4.24	2.098	5 29 36.88	136.06	25 50 7.4	- 43.2	68.29	14 48.3	54 13.4	I. S.
29	5 54.27	2.067	6 23 43.39	134.20	+24 55 16.5	-229.6	67.83	14 49.4	54 17.4	I. N.
30	6 43.26	2.013	7 16 47.42	130.99	22 48 7.8	-403.5	66.97	14 53.6	54 32.7	I. N.
31	7 30.87	1.954	8 8 27.95	127.40	19 35 0.1	-558.8	65.98	15 0.6	54 58.6	I. N.
Apr. 1	8 17.12	1.904	8 58 47.56	124.41	15 24 6.7	-691.7	65.12	15 10.3	55 34.0	I. N.
2	9 2.44	1.878	9 48 10.77	122.82	+10 25 5.5	-798.8	64.62	15 21.9	56 16.8	I. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Data.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Apr. 2	9 2.44	1.878	9 48 10.77	122.82	+10 25 5.5	-798.8	64.62	15 21.9	56 16.8	I. N.
3	9 47.53	1.886	10 37 19.69	123.30	+ 4 49 6.5	-875.6	64.68	15 34.8	57 4.1	I. N.
4	10 33.28	1.935	11 27 9.21	126.28	- 1 10 25.1	-915.1	65.42	15 47.9	57 52.1	I. N.
5	11 20.76	2.029	12 18 42.35	131.95	- 7 16 46.7	-907.9	66.89	16 0.0	58 36.8	I. S.
6	12 11.03	2.166	13 13 3.37	140.18	-13 9 5.6	-843.0	69.01	16 10.2	59 14.2	II. S.
7	13 4.97	2.331	14 11 5.07	150.11	-18 22 11.4	-710.6	71.52	16 17.4	59 40.7	II. S.
8	14 2.90	2.492	15 13 7.03	159.78	-22 28 17.7	-508.7	73.93	16 21.2	59 54.7	II. S.
9	15 4.16	2.600	16 18 29.27	166.29	-25 1 27.1	-249.6	75.55	16 21.6	59 56.0	II. S.
10	16 6.94	2.613	17 25 22.68	167.08	-25 44 21.6	+ 36.3	75.81	16 18.9	59 46.0	II. S.
11	17 8.78	2.525	18 31 19.72	161.76	-24 34 13.9	309.1	74.59	16 13.7	59 27.1	II. N.
12	18 7.59	2.369	19 34 14.86	152.40	-21 43 6.2	+537.2	72.33	16 7.0	59 2.4	II. N.
13	19 2.38	2.197	20 33 7.48	142.03	-17 32 24.8	706.0	69.72	15 59.3	58 34.0	II. N.
14	19 53.22	2.046	21 28 2.92	132.94	-12 26 10.7	815.7	67.33	15 51.1	58 3.9	II. N.
15	20 40.90	1.935	22 19 48.17	126.30	- 6 46 49.8	872.9	65.51	15 42.7	57 33.1	II. N.
16	21 26.49	1.872	23 9 27.73	122.47	- 0 53 56.0	884.5	64.41	15 34.3	57 2.3	II. N.
17	22 11.10	1.853	23 58 8.32	121.34	+ 4 55 26.2	+855.9	64.04	15 25.9	56 31.5	II. N.
18	22 55.75	1.873	0 46 50.72	122.55	10 25 52.3	790.2	64.32	15 17.7	56 1.3	II. N.
19	23 41.24	1.922	1 36 24.34	125.50	15 23 2.1	689.9	65.10	15 9.8	55 32.2	
20	0 28.13	1.987	2 27 22.09	129.40	19 33 31.0	557.4	66.14	15 2.4	55 5.3	
22	1 16.60	2.050	3 19 54.52	133.20	22 45 16.9	397.2	67.17	14 56.1	54 41.8	I. S.
23	2 6.37	2.093	4 13 45.85	135.79	+24 48 41.5	+217.2	67.91	14 51.0	54 23.1	I. S.
24	2 56.80	2.103	5 8 16.30	136.36	25 37 44.4	+ 27.4	68.12	14 47.7	54 11.1	I. S.
25	3 47.00	2.075	6 2 32.93	134.72	25 10 57.3	-160.1	67.76	14 46.6	54 7.2	I. S.
26	4 36.15	2.018	6 55 46.67	131.25	23 31 19.5	-335.3	66.93	14 48.1	54 12.6	I. N.
27	5 23.76	1.949	7 47 27.45	127.11	20 45 12.5	-491.7	65.87	14 52.4	54 28.3	I. N.
28	6 9.75	1.886	8 37 31.07	123.34	+17 0 54.0	-626.0	64.86	14 59.5	54 54.6	I. N.
29	6 54.47	1.846	9 26 18.32	120.89	12 27 28.7	-737.1	64.18	15 9.5	55 31.3	I. N.
30	7 38.60	1.839	10 14 30.02	120.49	7 14 30.7	-823.3	64.03	15 22.0	56 17.0	I. N.
May 1	8 23.07	1.875	11 3 1.94	122.65	+ 1 32 36.9	-880.8	64.57	15 36.3	57 9.5	I. N.
2	9 8.98	1.960	11 53 0.70	127.76	- 4 25 18.0	-901.8	65.87	15 51.4	58 5.3	I. N.
3	9 57.55	2.096	12 45 39.15	135.95	-10 22 20.8	-874.1	67.96	16 6.3	58 59.8	I. N.
4	10 49.93	2.276	13 42 7.27	146.76	-15 56 8.5	-783.1	70.67	16 19.3	59 47.7	I. N. S.
5	11 46.92	2.473	14 43 12.54	158.65	-20 38 35.9	-616.0	73.57	16 29.1	60 23.6	I. S.
6	12 48.40	2.639	15 48 47.92	168.64	-23 58 49.4	-373.6	75.96	16 34.5	60 43.3	II. S.
7	13 52.85	2.712	16 57 22.35	173.01	-25 30 31.7	- 79.6	77.03	16 35.0	60 45.1	II. S.
8	14 57.54	2.658	18 6 11.08	169.78	-25 1 44.2	+220.2	76.33	16 30.7	60 29.6	II. S.
9	15 59.61	2.502	19 12 22.10	160.37	-22 39 47.0	479.6	74.16	16 22.8	60 0.3	II. N.
10	16 57.30	2.303	20 14 9.08	148.42	-18 46 56.8	672.6	71.28	16 12.2	59 21.5	II. N.
11	17 50.27	2.116	21 11 12.55	137.19	-13 50 58.5	796.3	68.46	16 0.4	58 38.2	II. N.
12	18 39.22	1.972	22 4 14.45	128.47	- 8 17 47.5	860.7	66.17	15 48.3	57 53.8	II. N.
13	19 25.32	1.879	22 54 24.50	122.91	- 2 28 46.0	+877.3	64.64	15 36.8	57 11.3	II. N.
14	20 9.82	1.837	23 42 58.10	120.40	+ 3 18 54.9	855.1	63.91	15 26.1	56 32.1	II. N.
15	20 53.87	1.841	0 31 5.31	120.63	8 50 51.0	799.1	63.91	15 16.6	55 57.1	II. N.
16	21 38.48	1.881	1 19 45.54	123.05	13 54 1.6	711.6	64.51	15 8.2	55 26.4	II. N.
17	22 24.37	1.945	2 9 42.83	126.90	+18 15 59.7	+593.3	65.49	15 1.0	55 0.1	II. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limbs.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
May 17	22 24.37	1.945	2 9 42.83	126.90	+18 15 59.7	+593.3	65.49	15 1.0	55 0.1	II. N.
18	23 11.91	2.016	3 1 19.94	131.17	21 44 47.7	446.3	66.58	14 55.1	54 38.1	
20	0 1.05	2.075	3 54 32.74	134.66	24 9 46.4	275.3	67.48	14 50.2	54 20.5	
21	0 51.23	2.101	4 48 48.55	136.26	25 23 1.5	+89.4	67.91	14 46.8	54 7.8	
22	1 41.57	2.087	5 43 13.65	135.40	25 20 57.0	-99.1	67.74	14 44.9	54 0.9	I. S.
23	2 31.09	2.035	6 36 49.77	132.30	+24 4 57.5	-278.2	66.99	14 44.8	54 0.6	I. N.
24	3 19.07	1.961	7 28 52.90	127.84	21 40 52.8	-438.4	65.88	14 46.8	54 7.9	I. N.
25	4 5.20	1.885	8 19 5.02	123.24	18 17 21.5	-575.0	64.71	14 51.1	54 23.8	I. N.
26	4 49.66	1.824	9 7 36.28	119.60	14 4 9.3	-686.9	63.77	14 58.0	54 49.1	I. N.
27	5 33.00	1.794	9 55 0.26	117.76	9 11 7.1	-774.3	63.29	15 7.5	55 24.0	I. N.
28	6 16.07	1.803	10 42 8.12	118.34	+3 48 5.0	-836.4	63.46	15 19.6	56 8.1	I. N.
29	6 59.94	1.861	11 30 3.96	121.83	-1 54 20.8	-870.3	64.39	15 33.8	57 0.4	I. N.
30	7 45.83	1.973	12 20 1.82	128.55	-7 43 19.8	-867.6	66.16	15 49.5	57 58.1	I. N.
31	8 35.07	2.139	13 13 20.84	138.56	-13 21 50.2	-815.3	68.72	16 5.7	58 57.4	I. N.
June 1	9 28.86	2.348	14 11 13.45	151.14	-18 26 49.9	-697.3	71.82	16 20.8	59 53.0	I. N.
2	10 27.86	2.565	15 14 19.68	164.18	-22 29 5.7	-500.5	74.93	16 33.2	60 38.7	I. N. S.
3	11 31.54	2.726	16 22 7.74	173.88	-24 57 9.0	-229.0	77.18	16 41.3	61 8.4	I. S.
4	12 37.75	2.767	17 32 27.49	176.30	-25 26 44.2	+83.8	77.75	16 43.9	61 18.0	II. S.
5	13 43.22	2.668	18 42 3.01	170.38	-23 51 51.2	383.8	76.40	16 40.7	61 6.2	II. N. S.
6	14 45.08	2.478	19 48 1.51	158.92	-20 27 54.7	623.3	73.74	16 32.4	60 35.7	II. N.
7	15 41.98	2.265	20 49 1.26	146.14	-15 43 53.6	+783.4	70.64	16 20.3	59 51.1	II. N.
8	16 34.06	2.082	21 45 11.01	135.11	-10 11 10.5	868.9	67.89	16 6.0	58 58.7	II. N.
9	17 22.33	1.950	22 37 31.65	127.16	-4 16 38.8	895.1	65.83	15 51.1	58 3.8	II. N.
10	18 8.10	1.874	23 27 21.95	122.57	+1 38 53.1	876.0	64.60	15 36.7	57 10.9	II. N.
11	18 52.66	1.848	0 15 59.67	121.06	7 19 31.5	821.8	64.17	15 23.6	56 22.9	II. N.
12	19 37.16	1.866	1 4 33.25	122.13	+12 32 25.2	+737.9	64.42	15 12.3	55 41.3	II. N.
13	20 22.49	1.916	1 53 57.26	125.12	17 6 8.6	626.3	65.17	15 2.9	55 7.1	II. N.
14	21 9.25	1.982	2 44 47.38	129.12	20 49 52.5	488.1	66.17	14 55.6	54 40.1	II. N.
15	21 57.63	2.047	3 37 14.36	132.98	23 33 25.8	326.1	67.12	14 50.1	54 19.9	II. N.
16	22 47.31	2.088	4 31 0.08	135.50	25 8 18.2	+146.0	67.73	14 46.4	54 6.2	II. S.
17	23 37.56	2.092	5 25 20.06	135.75	+25 29 14.2	-41.7	67.77	14 44.2	53 58.4	
19	0 27.42	2.056	6 19 15.92	133.53	24 35 35.1	-224.8	67.19	14 43.7	53 56.3	
20	1 15.98	1.988	7 11 54.32	129.45	22 31 35.6	-391.8	66.15	14 44.7	54 0.1	I. N.
21	2 2.72	1.907	8 2 43.00	124.59	19 25 18.7	-535.3	64.90	14 47.4	54 10.0	I. N.
22	2 47.56	1.833	8 51 37.52	120.12	15 26 57.6	-652.0	63.75	14 51.9	54 26.6	I. N.
23	3 30.87	1.781	9 38 59.35	117.00	+10 47 19.2	-741.8	62.96	14 58.4	54 50.6	I. N.
24	4 13.32	1.763	10 25 29.99	115.96	5 37 2.0	-805.3	62.72	15 7.0	55 22.2	I. N.
25	4 55.85	1.789	11 12 5.60	117.47	+0 6 38.7	-842.0	63.19	15 17.9	56 2.0	I. N.
26	5 39.59	1.864	11 59 53.37	122.02	-5 32 31.6	-848.2	64.45	15 30.7	56 49.2	I. N.
27	6 25.77	1.994	12 50 8.67	129.81	-11 6 56.0	-816.5	66.54	15 45.3	57 42.6	I. N.
28	7 15.70	2.175	13 44 9.22	140.72	-16 18 58.8	-734.1	69.34	16 0.7	58 39.2	I. N.
29	8 10.47	2.392	14 43 0.51	153.75	-20 45 29.8	-586.5	72.55	16 15.9	59 35.2	I. N.
30	9 10.45	2.601	15 47 6.26	166.35	-23 58 8.1	-364.3	75.52	16 29.4	60 24.8	I. N.
July 1	10 14.73	2.738	16 55 30.04	174.55	-25 28 12.8	-77.7	77.38	16 37.5	61 1.8	I. N. S.
2	11 20.81	2.745	18 5 41.97	175.01	-24 56 40.9	+235.2	77.46	16 44.6	61 20.6	I. S.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
July	2 11 20.81	2.745	18 5 41.97	175.01	-24 56 40.9	+235.2	77.46	16 44.6	61 20.6	I. S.
	3 12 25.47	2.625	19 14 28.74	167.79	-22 23 51.9	519.8	75.77	16 44.0	61 18.2	II. N. S.
	4 13 26.25	2.433	20 19 21.98	156.25	-18 10 13.0	734.6	73.03	16 37.5	60 54.5	II. N.
	5 14 22.23	2.236	21 19 27.09	144.37	-12 47 23.5	865.7	70.13	16 26.3	60 13.3	II. N.
	6 15 13.85	2.073	22 15 8.84	134.60	-6 47 45.6	921.0	67.69	16 11.9	59 20.3	II. N.
	7 16 2.17	1.963	23 7 32.87	127.94	-0 38 29.9	+916.7	66.00	15 55.9	58 21.7	II. N.
	8 16 48.49	1.906	23 57 56.06	124.50	+5 19 37.8	867.5	65.11	15 39.9	57 23.0	II. N.
	9 17 34.01	1.895	0 47 31.14	123.86	10 51 0.6	784.3	64.96	15 25.1	56 28.6	II. N.
	10 18 19.74	1.921	1 37 19.14	125.46	15 43 22.4	673.1	65.39	15 12.3	55 41.6	II. N.
	11 19 6.43	1.972	2 28 4.59	128.48	19 46 14.7	537.3	66.17	15 1.9	55 3.3	II. N.
	12 19 54.45	2.029	3 20 10.27	131.96	+22 50 16.3	+379.4	67.04	14 54.0	54 34.1	II. N.
	13 20 43.74	2.075	4 13 32.65	134.69	24 47 25.0	203.9	67.69	14 48.5	54 14.1	II. N.
	14 21 33.81	2.091	5 7 41.36	135.68	25 31 59.8	+18.1	67.87	14 45.3	54 2.2	II. N.
	15 22 23.83	2.071	6 1 47.24	134.42	25 1 58.6	-167.2	67.48	14 44.2	53 58.1	II. S.
	16 23 12.92	2.016	6 54 57.40	131.13	23 19 45.4	-341.1	66.58	14 44.9	54 0.7	
	18 0 0.42	1.941	7 46 32.18	126.65	+20 31 53.3	-494.2	65.37	14 47.1	54 9.0	
	19 0 46.08	1.865	8 36 15.53	122.04	16 47 53.5	-621.1	64.14	14 50.9	54 22.8	
	20 1 30.03	1.802	9 24 16.60	118.27	12 18 48.7	-719.5	63.15	14 56.0	54 41.6	I. N.
	21 2 12.79	1.767	10 11 5.77	116.15	7 16 9.8	-789.0	62.61	15 2.5	55 5.5	I. N.
	22 2 55.13	1.768	10 57 29.14	116.20	+1 51 28.9	-829.5	62.68	15 10.3	55 34.5	I. N.
	23 3 37.98	1.812	11 44 24.21	118.85	-3 43 25.1	-839.7	63.48	15 19.8	56 8.9	I. N.
	24 4 22.46	1.903	12 32 56.90	124.38	-9 15 41.0	-815.4	65.03	15 30.6	56 48.7	I. N.
	25 5 9.74	2.044	13 24 17.66	132.83	-14 30 10.6	-749.3	67.31	15 42.7	57 33.2	I. N.
	26 6 0.91	2.226	14 19 32.96	143.77	-19 8 11.0	-631.1	70.13	15 55.7	58 20.9	I. N.
	27 6 56.72	2.425	15 19 27.48	155.74	-22 46 46.0	-451.0	73.08	16 8.8	59 9.0	I. N.
	28 7 57.08	2.595	16 23 55.07	165.97	-25 0 28.1	-207.8	75.49	16 21.0	59 53.9	I. N.
	29 9 0.59	2.680	17 31 33.19	171.11	-25 26 55.9	+80.2	76.64	16 30.9	60 30.3	I. N. S.
	30 10 4.78	2.650	18 39 51.67	169.27	-23 55 28.3	374.0	76.15	16 37.2	60 53.3	I. S.
	31 11 7.00	2.523	19 46 11.24	161.63	-20 33 4.4	628.0	74.29	16 38.6	60 58.3	I. S.
Aug.	1 12 5.53	2.353	20 48 49.49	151.41	-15 42 31.6	811.5	71.78	16 34.7	60 44.3	I. II. N.
	2 13 0.00	2.190	21 47 22.93	141.64	-9 54 33.4	+915.3	69.36	16 26.1	60 12.5	II. N.
	3 13 50.97	2.065	22 42 26.50	134.11	-3 39 53.9	946.9	67.46	16 13.5	59 26.4	II. N.
	4 14 39.50	1.987	23 35 2.59	129.39	+2 35 5.9	919.5	66.28	15 58.7	58 31.9	II. N.
	5 15 26.71	1.954	0 26 19.18	127.43	8 29 36.3	846.5	65.82	15 43.0	57 34.3	II. N.
	6 16 13.61	1.960	1 17 17.44	127.77	13 47 37.7	738.5	65.96	15 27.9	56 38.9	II. N.
	7 17 0.99	1.992	2 8 44.91	129.72	+18 16 42.9	+602.8	66.52	15 14.5	55 49.5	II. N.
	8 17 49.33	2.037	3 1 10.04	132.41	21 46 54.2	444.7	67.24	15 3.3	55 8.5	II. N.
	9 18 38.72	2.076	3 54 37.90	134.77	24 10 18.1	269.8	67.84	14 54.9	54 37.5	II. N.
	10 19 28.83	2.095	4 48 49.00	135.88	25 21 23.4	+84.6	68.08	14 49.3	54 16.9	II. N.
	11 20 19.00	2.082	5 43 4.48	135.09	25 17 47.1	-102.1	67.82	14 46.4	54 6.5	II. N.
	12 21 8.49	2.037	6 36 38.16	132.44	+24 0 50.3	-280.5	67.05	14 46.1	54 5.4	II. S.
	13 21 56.63	1.972	7 28 51.14	128.49	21 35 37.7	-442.1	65.94	14 48.0	54 12.3	II. S.
	14 22 43.09	1.900	8 19 23.00	124.18	18 10 15.8	-580.7	64.73	14 51.8	54 26.1	II. S.
	15 23 27.90	1.837	9 8 15.76	120.39	13 54 52.1	-691.7	63.67	14 57.0	54 45.3	
	17 0 11.44	1.796	9 55 51.73	117.89	+9 0 43.5	-773.9	62.97	15 3.3	55 8.6	

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Aug. 17	0 11.44	1.796	9 55 51.73	117.89	+ 9 0 43.5	-773.9	62.97	15 3.3	55 8.6	
18	0 54.34	1.785	10 42 49.02	117.23	+ 3 39 48.0	-825.4	62.81	15 10.6	55 35.1	
19	1 37.41	1.811	11 29 56.91	118.82	- 1 55 16.0	-844.2	63.29	15 18.4	56 4.0	I. N.
20	2 21.61	1.879	12 18 12.62	122.92	- 7 30 49.6	-827.2	64.45	15 26.9	56 35.0	I. N.
21	3 7.95	1.990	13 8 37.30	129.56	-12 51 36.2	-769.3	66.29	15 35.8	57 7.7	I. N.
22	3 57.41	2.138	14 2 9.67	138.47	-17 39 59.7	-664.1	68.67	15 45.1	57 41.9	I. N.
23	4 50.72	2.306	14 59 33.42	148.60	-21 35 43.7	-505.3	71.27	15 54.6	58 17.0	I. N.
24	5 48.01	2.463	16 0 56.92	158.03	-24 16 51.6	-291.6	73.60	16 4.1	58 51.7	I. N.
25	6 48.49	2.565	17 5 32.43	164.16	-25 23 4.2	-33.8	75.06	16 12.8	59 23.7	I. N.
26	7 50.40	2.578	18 11 33.83	164.98	-24 41 23.6	+242.4	75.21	16 20.1	59 50.4	I. S.
27	8 51.55	2.504	19 16 49.27	160.53	-22 11 30.6	+501.2	74.08	16 24.9	60 8.2	I. S.
28	9 50.18	2.376	20 19 33.18	152.79	-18 6 52.1	712.0	72.14	16 26.5	60 14.1	I. S.
29	10 45.51	2.237	21 18 58.84	144.42	-12 50 49.9	856.6	69.99	16 24.2	60 5.7	I. S.
30	11 37.72	2.119	22 15 16.17	137.35	- 6 50 55.8	931.4	68.18	16 18.0	59 42.9	I. N.
31	12 27.54	2.039	23 9 9.99	132.54	- 0 34 15.3	941.7	66.93	16 8.3	59 7.2	II. N.
Sept. 1	13 15.93	2.001	0 1 38.46	130.22	+ 5 35 5.3	+896.5	66.35	15 56.0	58 22.0	II. N.
2	14 3.86	1.999	0 53 38.56	130.12	11 16 51.0	805.5	66.38	15 42.3	57 31.7	II. N.
3	14 52.09	2.023	1 45 56.62	131.60	16 14 39.1	678.1	66.83	15 28.5	56 41.0	II. N.
4	15 41.10	2.061	2 39 1.82	133.89	20 15 34.7	522.4	67.49	15 15.7	55 53.9	II. N.
5	16 31.01	2.096	3 33 1.33	135.96	23 9 58.3	346.7	68.08	15 4.8	55 13.8	II. N.
6	17 21.56	2.112	4 27 38.82	136.90	+24 51 28.2	+159.6	68.36	14 56.3	54 42.8	II. N.
7	18 12.15	2.099	5 22 19.15	136.14	25 17 22.1	- 29.7	68.16	14 50.7	54 22.3	II. N.
8	19 2.07	2.057	6 16 19.30	133.60	24 28 43.5	-211.7	67.47	14 48.2	54 12.9	II. S.
9	19 50.71	1.994	7 9 2.23	129.84	22 30 3.7	-378.6	66.42	14 48.5	54 14.1	II. S.
10	20 37.73	1.924	8 0 7.63	125.64	19 28 33.2	-525.2	65.24	14 51.5	54 25.2	II. S.
11	21 23.14	1.862	8 49 36.22	121.90	+15 33 7.7	-647.7	64.16	14 56.8	54 44.6	II. S.
12	22 7.27	1.820	9 37 48.13	119.34	10 53 49.8	-744.1	63.40	15 3.9	55 10.5	II. S.
13	22 50.72	1.806	10 25 18.72	118.54	5 41 38.8	-811.7	63.12	15 12.2	55 40.9	II. S.
14	23 34.25	1.828	11 12 54.31	119.82	+ 0 8 43.4	-847.1	63.45	15 21.1	56 13.7	
16	0 18.76	1.888	12 1 28.52	123.44	- 5 31 9.0	-845.5	64.43	15 30.1	56 46.8	
17	1 5.18	1.987	12 51 58.24	129.43	-11 2 1.9	-801.1	66.05	15 38.8	57 18.7	I. N.
18	1 54.43	2.121	13 45 17.44	137.46	-16 5 26.0	-707.3	68.20	15 46.7	57 47.9	I. N.
19	2 47.14	2.273	14 42 5.68	146.62	-20 20 31.3	-559.2	70.58	15 53.8	58 14.0	I. N.
20	3 43.46	2.415	15 42 30.70	155.17	-23 25 27.9	-357.3	72.75	16 0.0	58 36.6	I. N.
21	4 42.70	2.509	16 45 50.83	160.83	-25 0 37.7	-113.0	74.17	16 5.2	58 55.6	I. N.
22	5 43.29	2.526	17 50 33.09	161.83	-24 53 19.6	+150.2	74.43	16 9.2	59 10.5	I. N.
23	6 43.30	2.463	18 54 39.97	158.04	-23 1 56.4	402.3	73.51	16 12.0	59 20.9	I. S.
24	7 41.10	2.348	19 56 33.81	151.12	-19 36 36.2	616.3	71.77	16 13.3	59 25.5	I. S.
25	8 35.89	2.219	20 55 27.24	143.37	-14 56 5.9	776.4	69.78	16 12.6	59 23.1	I. S.
26	9 27.77	2.108	21 51 24.88	136.70	- 9 23 22.5	877.1	68.00	16 9.7	59 12.3	I. S.
27	10 17.38	2.032	22 45 6.17	132.12	- 3 22 9.6	+919.4	66.76	16 4.3	58 52.7	I. S.
28	11 5.64	1.996	23 37 26.23	129.95	+ 2 44 51.1	906.9	66.15	15 56.7	58 24.4	I. N. S.
29	11 53.49	1.997	0 29 21.57	130.01	8 36 49.0	845.1	66.16	15 47.0	57 48.9	I. II. N.
30	12 41.72	2.026	1 21 40.27	131.77	13 55 5.1	739.5	66.64	15 36.0	57 8.7	II. N.
Oct. 1	13 30.88	2.071	2 14 54.29	134.45	+18 23 35.9	+597.6	67.39	15 24.6	56 26.8	II. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Oct. 1	13 30.88	2.071	2 14 54.29	134.45	+18 23 35.9	+597.6	67.39	15 24.6	56 26.8	II. N.
2	14 21.11	2.113	3 9 13.08	136.99	21 49 23.6	427.6	68.11	15 13.6	55 46.4	II. N.
3	15 12.16	2.136	4 4 20.62	138.36	24 3 20.5	240.2	68.53	15 3.9	55 10.7	II. N.
4	16 3.38	2.127	4 59 38.89	137.83	25 0 50.6	+ 47.4	68.45	14 56.2	54 42.4	II. N.
5	16 53.98	2.084	5 54 19.52	135.27	24 42 2.4	-139.5	67.84	14 51.1	54 23.5	II. N.
6	17 43.23	2.017	6 47 39.45	131.22	+23 11 15.2	-311.4	66.81	14 48.8	54 15.2	II. S.
7	18 30.73	1.941	7 39 13.75	126.63	20 35 41.9	-462.8	65.58	14 49.6	54 18.1	II. S.
8	19 16.45	1.871	8 29 0.76	122.44	17 4 5.3	-591.4	64.42	14 53.4	54 31.9	II. S.
9	20 0.71	1.822	9 17 20.40	119.46	12 45 42.1	-696.5	63.55	14 59.9	54 55.8	II. S.
10	20 44.13	1.802	10 4 49.19	118.28	7 50 8.3	-777.0	63.16	15 8.7	55 28.2	II. S.
11	21 27.50	1.819	10 52 15.40	119.30	+ 2 27 45.1	-830.0	63.36	15 19.1	56 6.6	II. S.
12	22 11.77	1.877	11 40 35.14	122.78	- 3 9 28.7	-850.1	64.25	15 30.6	56 48.5	II. S.
13	22 57.93	1.977	12 30 48.91	128.80	- 8 46 53.2	-829.4	65.82	15 42.0	57 30.5	II. N.
14	23 46.96	2.115	13 23 55.66	137.10	-14 6 14.1	-758.1	67.97	15 52.5	58 9.0	
16	0 39.64	2.277	14 20 41.49	146.84	-18 45 31.0	-627.9	70.44	16 1.3	58 41.5	
17	1 36.20	2.432	15 21 20.79	156.17	-22 20 21.3	-436.4	72.80	16 7.8	59 5.5	I. N.
18	2 35.99	2.539	16 25 14.79	162.62	-24 27 47.0	-194.0	74.40	16 11.8	59 20.2	I. N.
19	3 37.39	2.561	17 30 45.14	163.96	-24 52 6.0	+ 73.8	74.78	16 13.4	59 25.9	I. N.
20	4 38.21	2.494	18 35 41.04	159.89	-23 30 2.5	332.2	73.86	16 12.8	59 23.8	I. S.
21	5 36.59	2.365	19 38 10.04	152.14	-20 31 34.4	552.0	72.01	16 10.5	59 15.4	I. S.
22	6 31.60	2.219	20 37 15.86	143.38	-16 15 43.0	+717.8	69.82	16 6.9	59 1.9	I. S.
23	7 23.27	2.092	21 33 1.17	135.71	-11 4 59.5	826.6	67.83	16 2.1	58 44.5	I. S.
24	8 12.31	2.002	22 26 8.26	130.32	- 5 21 34.9	881.9	66.36	15 56.5	58 23.7	I. S.
25	8 59.72	1.957	23 17 37.56	127.58	+ 0 34 5.0	888.8	65.57	15 49.9	57 59.5	I. S.
26	9 46.56	1.953	0 8 32.21	127.38	6 23 15.5	850.0	65.46	15 42.4	57 32.1	I. S.
27	10 33.76	1.985	0 59 48.57	129.28	+11 48 29.7	+769.3	65.91	15 34.2	57 1.9	I. S.
28	11 22.02	2.039	1 52 8.33	132.51	16 33 28.9	649.4	66.73	15 25.4	56 29.6	I. N.
29	12 11.66	2.097	2 45 51.31	136.01	20 23 29.7	495.5	67.64	15 16.4	55 56.7	II. N.
30	13 2.54	2.139	3 40 49.35	138.56	23 6 31.9	316.3	68.34	15 7.8	55 24.9	II. N.
31	13 54.07	2.148	4 36 26.17	139.12	24 34 45.3	+123.9	68.53	15 0.0	54 56.4	II. N.
Nov. 1	14 45.34	2.117	5 31 47.34	137.25	+24 45 41.0	- 68.0	68.13	14 53.7	54 33.3	II. N.
2	15 35.39	2.050	6 25 55.13	133.21	23 42 12.6	-246.5	67.16	14 49.5	54 17.6	II. S.
3	16 23.60	1.965	7 18 12.07	128.11	21 31 23.2	-403.7	65.88	14 47.7	54 11.0	II. S.
4	17 9.74	1.881	8 8 24.72	123.05	18 22 29.9	-536.6	64.56	14 48.7	54 14.7	II. S.
5	17 54.04	1.814	8 56 46.53	119.01	14 25 22.1	-645.0	63.48	14 52.7	54 29.4	II. S.
6	18 37.07	1.777	9 43 51.66	116.76	+ 9 49 29.3	-730.5	62.84	14 59.6	54 55.0	II. S.
7	19 19.63	1.777	10 30 28.92	116.77	+ 4 44 4.9	-792.5	62.81	15 9.4	55 30.9	II. S.
8	20 2.70	1.821	11 17 37.13	119.39	- 0 41 6.3	-828.6	63.47	15 21.5	56 15.2	II. S.
9	20 47.39	1.911	12 6 22.17	121.86	- 6 14 28.5	-832.0	64.89	15 35.1	57 5.2	II. S.
10	21 34.83	2.050	12 57 53.03	133.17	-11 41 1.1	-792.4	67.01	15 49.3	57 57.3	II. S.
11	22 26.09	2.227	13 53 13.34	143.82	-16 40 55.1	-696.6	69.69	16 2.8	58 47.1	II. S.
12	23 21.83	2.418	14 53 3.57	155.30	-20 49 21.8	-533.9	72.50	16 14.4	59 29.4	
14	0 21.88	2.577	15 57 13.06	164.88	-23 39 5.6	-304.6	74.80	16 22.7	60 0.1	
15	1 24.83	2.651	17 4 16.74	169.33	-24 46 48.8	- 28.9	75.88	16 27.0	60 15.8	I. N.
16	2 28.20	2.612	18 11 46.26	166.99	-24 1 36.8	+252.5	75.39	16 27.1	60 16.1	I. N.

## AT TRANSIT OF MOON'S CENTRE OVER THE MERIDIAN OF WASHINGTON.

Date.	Mean Time of Transit.	Diff. for 1 Hour of Long.	Right Ascension of Centre.	Diff. for 1 Hour of Long.	Geocentric Declination of Centre.	Diff. for 1 Hour of Long.	Sid. Time of Semid. Passing Meridian.	Geocentric Semi-diameter.	Equatorial Horizontal Parallax.	Bright Limb.
	h m	m	h m s	s	° ' "	"	s	' "	' "	
Nov. 16	2 28.20	2.612	18 11 46.26	166.99	-24 1 36.8	+252.5	75.39	16 27.1	60 16.1	I. N.
17	3 29.45	2.480	19 17 7.38	159.07	-21 29 34.3	499.0	73.57	16 23.4	60 2.7	I. S.
18	4 26.93	2.309	20 18 42.77	148.74	-17 30 33.5	685.0	71.11	16 16.8	59 38.5	I. S.
19	5 20.33	2.146	21 16 11.92	138.97	-12 30 21.8	805.4	68.68	16 8.3	59 7.3	I. S.
20	6 10.25	2.022	22 10 11.64	131.47	- 6 54 7.1	866.8	66.75	15 58.9	58 32.7	I. S.
21	6 57.76	1.946	23 1 46.53	126.94	- 1 3 28.9	+878.9	65.52	15 49.2	57 57.0	I. S.
22	7 44.05	1.919	23 52 8.17	125.34	+ 4 43 19.6	848.7	65.04	15 39.7	57 22.0	I. S.
23	8 30.23	1.935	0 42 23.20	126.30	10 10 28.2	780.9	65.24	15 30.6	56 48.7	I. S.
24	9 17.21	1.983	1 33 26.01	129.18	15 3 23.4	677.8	65.94	15 22.0	56 17.2	I. S.
25	10 5.56	2.047	2 25 51.72	133.03	19 8 20.9	541.6	66.89	15 14.1	55 47.9	I. S.
26	10 55.43	2.107	3 19 49.04	136.59	+22 12 52.4	+376.8	67.77	15 6.6	55 20.7	I. N. S.
27	11 46.46	2.140	4 14 55.75	138.61	24 7 6.6	192.1	68.26	15 0.0	54 56.2	I. II. N.
28	12 37.82	2.132	5 10 22.28	138.15	24 45 34.2	+ 0.3	68.17	14 54.2	54 34.9	II. N.
29	13 28.48	2.082	6 5 6.28	135.12	24 8 19.1	-184.2	67.43	14 49.6	54 18.2	II. N. S.
30	14 17.51	2.001	6 58 13.08	130.22	22 20 43.3	-349.9	66.22	14 46.6	54 7.2	II. S.
Dec. 1	15 4.42	1.908	7 49 11.69	124.65	+19 31 50.1	-490.0	64.81	14 45.6	54 3.4	II. S.
2	15 49.16	1.824	8 38 0.22	119.57	15 52 18.0	-603.2	63.51	14 46.8	54 7.8	II. S.
3	16 32.14	1.763	9 25 2.32	115.92	11 32 40.3	-690.9	62.55	14 50.7	54 22.0	II. S.
4	17 14.04	1.736	10 11 0.21	114.31	6 42 45.3	-755.0	62.15	14 57.3	54 46.4	II. S.
5	17 55.80	1.751	10 56 48.99	115.21	+ 1 31 47.5	-795.9	62.41	15 6.8	55 21.4	II. S.
6	18 38.47	1.813	11 43 33.07	118.97	- 3 50 36.1	-811.2	63.44	15 19.0	56 6.1	II. S.
7	19 23.25	1.927	12 32 23.77	125.78	- 9 13 0.1	-794.5	65.24	15 33.4	56 59.0	II. S.
8	20 11.37	2.091	13 24 35.35	135.66	-14 20 22.1	-734.0	67.78	15 49.2	57 57.2	II. S.
9	21 3.93	2.294	14 21 14.22	147.86	-18 52 25.7	-615.5	70.80	16 5.3	58 56.1	II. S.
10	22 1.53	2.503	15 22 56.03	160.44	-22 23 24.9	-427.4	73.81	16 20.0	59 50.2	II. S.
11	23 3.68	2.662	16 29 11.89	170.04	-24 25 19.8	-172.4	76.04	16 31.7	60 33.1	
13	0 8.47	2.715	17 38 6.13	173.19	-24 36 2.8	+121.7	76.76	16 38.8	60 59.2	
14	1 12.97	2.641	18 46 43.59	168.77	-22 49 6.7	407.2	75.75	16 40.5	61 5.3	I. S.
15	2 14.55	2.481	19 52 25.02	159.11	-19 17 31.2	639.2	73.51	16 36.7	60 51.5	I. S.
16	3 11.85	2.295	20 53 49.00	147.93	-14 27 52.3	796.0	70.84	16 28.4	60 20.8	I. S.
17	4 4.89	2.132	21 50 56.88	138.12	- 8 50 34.2	+879.0	68.43	16 16.8	59 38.2	I. S.
18	4 54.56	2.015	22 44 41.45	131.11	- 2 52 56.4	900.1	66.66	16 3.5	58 49.5	I. S.
19	5 42.05	1.951	23 36 15.51	127.24	+ 3 3 0.8	872.6	65.65	15 49.8	57 59.2	I. S.
20	6 28.60	1.935	0 26 52.32	126.28	8 39 59.9	806.5	65.39	15 36.7	57 11.2	I. S.
21	7 15.25	1.958	1 17 35.76	127.68	13 43 51.3	707.7	65.73	15 24.9	56 27.8	I. S.
22	8 2.81	2.008	2 9 13.42	130.64	+18 2 12.7	+579.5	66.45	15 14.6	55 49.8	I. S.
23	8 51.68	2.065	3 2 10.35	134.08	21 23 54.6	425.1	67.28	15 5.9	55 17.9	I. S.
24	9 41.81	2.109	3 56 23.16	136.75	23 39 25.5	249.7	67.90	14 58.7	54 51.7	I. S.
25	10 32.66	2.122	4 51 19.28	137.54	24 42 8.0	+ 62.8	68.04	14 53.1	54 30.9	I. N. S.
26	11 23.34	2.094	5 46 4.95	135.86	24 29 48.7	-123.3	67.57	14 48.8	54 15.2	I. N. S.
27	12 12.89	2.029	6 39 42.46	131.97	+23 5 20.3	-296.0	66.55	14 45.9	54 4.4	II. N. S.
28	13 0.58	1.943	7 31 28.39	126.75	20 36 5.2	-445.9	65.20	14 44.4	53 58.8	II. S.
29	13 46.12	1.853	8 21 4.75	121.35	17 12 16.6	-568.4	63.80	14 44.4	53 58.8	II. S.
30	14 29.65	1.778	9 8 40.03	116.80	13 5 8.5	-662.7	62.61	14 46.1	54 5.2	II. S.
31	15 11.66	1.729	9 54 44.29	113.88	+ 8 25 39.4	-730.4	61.87	14 49.8	54 19.0	II. S.



## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	0 56.1	19 37 47.19	20 25 29.5	12.0	4.5	0.32	Feb. 13	22 52.0	20 30 45.18	20 15 34.9	7.2	2.7	0.19
1	0 48.9	19 34 33.38	20 13 20.1	12.3	4.6	0.33	14	22 54.2	20 36 52.05	19 59 41.6	7.2	2.7	0.19
2	0 41.0	19 30 35.37	20 2 51.7	12.5	4.7	0.34	15	22 56.4	20 43 1.62	19 42 30.0	7.1	2.7	0.19
3	0 32.5	19 25 58.73	19 54 5.8	12.8	4.8	0.34	16	22 58.6	20 49 13.69	19 23 59.9	7.0	2.7	0.19
4	0 23.5	19 20 51.09	19 47 2.5	13.0	4.8	0.34	17	23 0.9	20 55 28.10	19 4 11.0	7.0	2.6	0.19
5	0 14.1	19 15 21.57	19 41 38.9	13.2	4.9	0.35	18	23 3.2	21 1 44.69	18 43 3.0	6.9	2.6	0.18
6	0 4.5	19 9 40.43	19 37 51.1	13.2	5.0	0.35	19	23 5.6	21 8 3.32	18 20 35.7	6.9	2.6	0.18
6	23 54.9	19 3 58.39	19 35 34.8	13.1	5.0	0.35	20	23 8.0	21 14 23.89	17 56 48.9	6.9	2.6	0.18
7	23 45.5	18 58 25.74	19 34 45.7	13.0	4.9	0.35	21	23 10.4	21 20 46.30	17 31 42.6	6.8	2.6	0.18
8	23 36.3	18 53 11.95	19 35 19.3	13.0	4.9	0.34	22	23 12.8	21 27 10.48	17 5 16.7	6.8	2.5	0.18
9	23 27.6	18 48 24.78	19 37 11.0	12.8	4.8	0.34	23	23 15.3	21 33 36.36	16 37 31.0	6.7	2.5	0.18
10	23 19.5	18 44 10.38	19 40 15.9	12.8	4.8	0.34	24	23 17.8	21 40 3.90	16 8 25.5	6.7	2.5	0.18
11	23 12.0	18 40 33.09	19 44 28.6	12.6	4.7	0.33	25	23 20.4	21 46 33.06	15 38 0.1	6.7	2.5	0.18
12	23 5.1	18 37 35.41	19 49 42.7	12.3	4.6	0.33	26	23 23.0	21 53 3.81	15 6 15.1	6.7	2.5	0.18
13	22 58.8	18 35 18.40	19 55 51.1	12.0	4.6	0.32	27	23 25.6	21 59 36.16	14 33 10.5	6.6	2.5	0.17
14	22 53.2	18 33 41.88	20 2 45.6	11.8	4.5	0.31	28	23 28.2	22 6 10.13	13 58 46.2	6.6	2.5	0.17
15	22 48.4	18 32 44.74	20 10 17.6	11.6	4.4	0.31	Mar. 1	23 30.8	22 12 45.72	13 23 2.5	6.6	2.5	0.17
16	22 44.1	18 32 25.23	20 18 18.1	11.4	4.3	0.30	2	23 33.5	22 19 22.97	12 45 59.7	6.5	2.5	0.17
17	22 40.4	18 32 41.19	20 26 38.1	11.1	4.2	0.30	3	23 36.2	22 26 1.92	12 7 37.9	6.5	2.5	0.17
18	22 37.2	18 33 30.23	20 35 8.5	10.9	4.1	0.29	4	23 38.9	22 32 42.62	11 27 57.5	6.5	2.5	0.17
19	22 34.7	18 34 49.87	20 43 41.0	10.6	4.0	0.29	5	23 41.7	22 39 25.12	10 46 58.9	6.5	2.5	0.17
20	22 32.6	18 36 37.62	20 52 7.4	10.4	3.9	0.28	6	23 44.5	22 46 9.49	10 4 43.0	6.5	2.5	0.17
21	22 30.9	18 38 51.10	21 0 19.9	10.2	3.8	0.27	7	23 47.3	22 52 55.81	9 21 10.4	6.5	2.5	0.17
22	22 29.6	18 41 28.04	21 8 11.5	10.0	3.7	0.27	8	23 50.1	22 59 44.12	8 36 21.8	6.5	2.4	0.17
23	22 28.6	18 44 26.34	21 15 35.7	9.8	3.6	0.26	9	23 53.0	23 6 34.48	7 50 18.5	6.5	2.4	0.16
24	22 27.9	18 47 44.05	21 22 26.8	9.5	3.6	0.26	10	23 55.9	23 13 26.95	7 3 1.9	6.5	2.4	0.16
25	22 27.5	18 51 19.36	21 28 39.2	9.3	3.5	0.25	11	23 58.9	23 20 21.59	6 14 33.8	6.5	2.4	0.16
26	22 27.4	18 55 10.65	21 34 8.3	9.2	3.4	0.25	13	0 1.9	23 27 18.43	5 24 56.1	6.5	2.5	0.16
27	22 27.5	18 59 16.47	21 38 49.7	9.0	3.4	0.24	14	0 4.9	23 34 17.47	4 34 11.3	6.5	2.5	0.16
28	22 28.0	19 3 35.46	21 42 39.8	8.9	3.3	0.24	15	0 8.0	23 41 18.69	3 42 22.4	6.5	2.5	0.17
29	22 28.6	19 8 6.41	21 45 35.1	8.7	3.2	0.23	16	0 11.1	23 48 22.05	2 49 32.9	6.6	2.5	0.17
30	22 29.3	19 12 48.22	21 47 32.6	8.6	3.2	0.23	17	0 14.3	23 55 27.46	1 55 47.2	6.6	2.5	0.17
31	22 30.2	19 17 39.92	21 48 29.5	8.5	3.1	0.23	18	0 17.4	0 2 34.75	1 1 10.1	6.6	2.5	0.17
Feb. 1	22 31.2	19 22 40.66	21 48 23.3	8.4	3.1	0.23	19	0 20.5	0 9 43.72	0 5 47.4	6.7	2.5	0.17
2	22 32.5	19 27 49.62	21 47 12.1	8.2	3.1	0.22	20	0 23.9	0 16 54.09	+ 0 50 14.1	6.7	2.5	0.17
3	22 33.8	19 33 6.03	21 44 53.9	8.1	3.0	0.22	21	0 27.1	0 24 5.47	+ 1 46 46.6	6.8	2.6	0.17
4	22 35.3	19 38 29.27	21 41 27.0	8.0	3.0	0.22	22	0 30.3	0 31 17.40	2 43 41.8	6.8	2.6	0.17
5	22 36.8	19 43 58.78	21 36 49.9	7.9	3.0	0.22	23	0 33.6	0 38 29.29	3 40 49.9	6.9	2.6	0.17
6	22 38.5	19 49 34.00	21 31 1.3	7.8	2.9	0.21	24	0 36.8	0 45 40.45	4 37 59.8	6.9	2.6	0.18
7	22 40.2	19 55 14.43	21 23 59.9	7.7	2.9	0.21	25	0 40.0	0 52 50.08	5 34 59.5	7.0	2.7	0.18
8	22 42.0	20 0 59.66	21 15 44.8	7.6	2.9	0.21	26	0 43.2	0 59 57.24	+ 6 31 36.0	7.1	2.7	0.18
9	22 43.8	20 6 49.32	21 6 15.1	7.5	2.8	0.20	27	0 46.2	1 7 0.90	7 27 36.1	7.2	2.7	0.18
10	22 45.8	20 12 43.02	20 55 30.0	7.4	2.8	0.20	28	0 49.3	1 13 59.92	8 22 46.0	7.3	2.8	0.18
11	22 47.8	20 18 40.41	20 43 28.6	7.3	2.8	0.20	29	0 52.2	1 20 53.04	9 16 51.3	7.5	2.8	0.19
12	22 49.9	20 24 41.22	20 30 10.4	7.3	2.7	0.20	30	0 55.0	1 27 38.96	10 9 37.6	7.6	2.8	0.19
13	22 52.0	20 30 45.18	20 15 34.9	7.2	2.7	0.19	31	0 57.7	1 34 16.34	+ 11 0 50.8	7.8	2.8	0.20
							32	1 0.2	1 40 43.78	+ 11 50 17.7	8.0	2.8	0.20

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
Apr. 1	h m	h m s	° ' "	"	"	s	May 16	h m	h m s	° ' "	"	"	s
2	1 0.2	1 40 43.78	+11 50 17.7	8.0	2.8	0.20	17	22 37.6	2 19 4.09	+10 32 23.5	13.5	5.1	0.35
3	1 2.5	1 46 59.92	12 37 46.0	8.2	2.9	0.21	18	22 34.9	2 20 15.74	10 31 31.7	13.3	5.0	0.34
4	1 4.6	1 53 3.41	13 23 4.0	8.4	3.0	0.21	19	22 32.4	2 21 42.96	10 33 0.1	13.0	4.9	0.33
5	1 6.5	1 58 52.95	14 6 1.6	8.6	3.2	0.22	20	22 30.2	2 23 25.45	10 36 44.7	12.8	4.8	0.33
6	1 8.2	2 4 27.28	14 46 30.3	8.8	3.3	0.23	21	22 28.2	2 25 22.91	10 42 41.3	12.5	4.7	0.32
7	1 9.5	2 9 45.23	+15 24 22.1	9.0	3.4	0.23	22	22 26.5	2 27 35.01	+10 50 44.7	12.3	4.6	0.31
8	1 10.6	2 14 45.71	15 59 30.6	9.3	3.5	0.24	23	22 25.0	2 30 1.44	11 0 49.6	12.0	4.6	0.31
9	1 11.4	2 19 27.71	16 31 50.5	9.5	3.6	0.25	24	22 23.8	2 32 41.88	11 12 50.8	11.8	4.5	0.30
10	1 11.8	2 23 50.29	17 1 17.5	9.8	3.7	0.25	25	22 22.7	2 35 36.05	11 26 42.9	11.5	4.4	0.29
11	1 11.9	2 27 52.66	17 27 48.4	10.1	3.8	0.26	26	22 21.9	2 38 43.69	11 42 20.0	11.3	4.3	0.29
12	1 11.6	2 31 34.12	+17 51 20.5	10.3	3.9	0.27	27	22 21.3	2 42 4.57	+11 59 36.4	11.1	4.2	0.28
13	1 11.0	2 34 53.99	18 11 51.5	10.6	4.0	0.28	28	22 20.9	2 45 38.48	12 18 26.4	10.8	4.1	0.27
14	1 10.0	2 37 51.73	18 29 19.6	10.9	4.1	0.29	29	22 20.7	2 49 25.26	12 38 44.1	10.6	4.0	0.27
15	1 8.7	2 40 26.90	18 43 43.6	11.2	4.2	0.29	30	22 20.8	2 53 24.77	13 0 24.1	10.3	3.9	0.26
16	1 7.0	2 42 39.19	18 55 3.0	11.6	4.4	0.30	31	22 21.1	2 57 36.90	13 23 20.5	10.1	3.8	0.26
17	1 4.8	2 44 28.42	+19 3 16.8	11.9	4.5	0.31	June 1	22 21.5	3 2 1.60	+13 47 27.3	9.9	3.7	0.25
18	1 2.3	2 45 54.56	19 8 24.8	12.2	4.6	0.32	2	22 22.1	3 6 38.85	14 12 38.7	9.7	3.7	0.25
19	0 59.4	2 46 57.73	19 10 27.8	12.5	4.7	0.33	3	22 23.0	3 11 28.66	14 38 48.9	9.5	3.6	0.25
20	0 56.2	2 47 38.22	19 9 26.9	12.8	4.9	0.34	4	22 24.2	3 16 31.10	15 5 51.9	9.3	3.6	0.24
21	0 52.6	2 47 56.55	19 5 24.0	13.2	5.0	0.35	5	22 25.5	3 21 46.21	15 33 41.3	9.1	3.5	0.24
22	0 48.6	2 47 53.43	+18 58 22.1	13.5	5.1	0.36	6	22 27.0	3 27 14.10	+16 2 10.9	9.0	3.4	0.24
23	0 44.2	2 47 29.79	18 48 25.5	13.8	5.2	0.36	7	22 28.7	3 32 54.92	16 31 14.4	8.8	3.4	0.23
24	0 39.6	2 46 46.86	18 35 40.1	14.1	5.3	0.37	8	22 30.6	3 38 48.82	17 0 44.4	8.6	3.3	0.23
25	0 34.7	2 45 46.06	18 20 13.7	14.3	5.4	0.38	9	22 32.7	3 44 55.97	17 30 33.8	8.5	3.2	0.23
26	0 29.5	2 44 29.07	18 2 15.8	14.6	5.5	0.39	10	22 35.1	3 51 16.54	18 0 35.1	8.3	3.1	0.22
27	0 24.0	2 42 57.79	+17 41 58.1	14.9	5.6	0.39	11	22 37.8	3 57 50.71	+18 30 40.5	8.2	3.1	0.22
28	0 18.4	2 41 14.35	17 19 34.8	15.1	5.7	0.40	12	22 40.8	4 4 38.65	19 0 41.2	8.0	3.0	0.22
29	0 12.5	2 39 21.04	16 55 22.2	15.3	5.7	0.40	13	22 43.9	4 11 40.49	19 30 28.4	7.9	3.0	0.21
30	0 6.6	2 37 20.26	16 29 38.1	15.4	5.8	0.40	14	22 47.2	4 18 56.30	19 59 52.5	7.7	2.9	0.21
31	0 0.6	2 35 14.50	16 2 42.7	15.6	5.8	0.41	15	22 50.7	4 26 26.13	20 28 43.2	7.6	2.9	0.21
May 1	23 54.5	2 33 6.30	+15 34 57.1	15.7	5.9	0.41	16	22 54.4	4 34 9.97	+20 56 49.9	7.5	2.8	0.20
2	23 48.5	2 30 58.15	15 6 43.3	15.7	5.9	0.41	17	22 58.4	4 42 7.67	21 24 1.3	7.4	2.8	0.20
3	23 42.5	2 28 52.48	14 38 23.6	15.8	5.9	0.41	18	23 2.6	4 50 18.97	21 50 5.6	7.3	2.8	0.20
4	23 36.5	2 26 51.59	14 10 20.4	15.8	5.9	0.41	19	23 7.1	4 58 43.48	22 14 50.7	7.2	2.7	0.20
5	23 30.7	2 24 57.63	13 42 55.3	15.7	5.9	0.41	20	23 11.8	5 7 20.65	22 38 4.4	7.1	2.7	0.19
6	23 25.0	2 23 12.50	+13 16 28.5	15.7	5.9	0.41	21	23 16.7	5 16 9.75	+22 59 34.2	7.0	2.7	0.19
7	23 19.5	2 21 37.90	12 51 18.7	15.6	5.8	0.40	22	23 21.7	5 25 9.86	23 19 8.1	7.0	2.7	0.19
8	23 14.2	2 20 15.31	12 27 42.3	15.5	5.8	0.40	23	23 26.9	5 34 19.90	23 36 34.5	6.9	2.6	0.19
9	23 9.2	2 19 5.96	12 5 53.8	15.3	5.7	0.40	24	23 32.3	5 43 38.60	23 51 42.8	6.9	2.6	0.19
10	23 4.3	2 18 10.83	11 46 5.1	15.2	5.7	0.39	25	23 37.7	5 53 4.53	24 4 23.2	6.8	2.6	0.19
11	22 59.7	2 17 30.68	+11 28 25.6	15.0	5.6	0.39	26	23 43.3	6 2 36.10	+24 14 27.5	6.8	2.6	0.19
12	22 55.4	2 17 6.06	11 13 3.0	14.8	5.5	0.38	27	23 48.9	6 12 11.63	24 21 49.2	6.8	2.6	0.18
13	22 51.3	2 16 57.36	11 0 2.6	14.6	5.5	0.38	28	23 54.6	6 21 49.42	24 26 23.8	6.7	2.6	0.18
14	22 47.4	2 17 4.79	10 49 27.6	14.3	5.4	0.37	29	0 0.2	6 31 27.72	24 28 8.4	6.7	2.5	0.18
15	22 43.9	2 17 28.44	10 41 19.7	14.0	5.3	0.36	30	0 5.9	6 41 4.83	24 27 2.2	6.7	2.5	0.18
16	22 40.6	2 18 8.26	+10 35 38.8	13.8	5.2	0.35	31	0 11.5	6 50 39.13	+24 23 6.4	6.7	2.5	0.18
17	22 37.6	2 19 4.09	+10 32 23.5	13.5	5.1	0.35	32	0 17.1	7 0 9.10	+24 16 23.9	6.7	2.5	0.18

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.
July 1	h m	h m s	° ' "	"	"	s	Aug. 16	h m	h m s	° ' "	"	"	s
2	0 11.5	6 50 39.13	+24 23 6.4	6.7	2.5	0.18	17	1 36.5	11 17 12.46	+1 17 8.4	11.2	4.3	0.28
3	0 17.1	7 0 9.10	24 16 23.9	6.7	2.5	0.18	18	1 34.1	11 18 43.43	0 56 11.5	11.4	4.3	0.29
4	0 22.5	7 9 33.33	24 6 59.1	6.7	2.5	0.18	19	1 31.4	11 19 58.54	0 37 13.8	11.6	4.4	0.29
5	0 27.8	7 18 50.62	23 54 57.7	6.7	2.5	0.18	20	1 28.4	11 20 57.07	0 20 24.9	11.8	4.5	0.30
6	0 33.0	7 27 59.90	23 40 26.4	6.7	2.5	0.18	21	1 25.2	11 21 38.29	+0 5 55.1	12.0	4.6	0.30
7	0 38.1	7 37 0.27	+23 23 32.9	6.8	2.5	0.18	22	1 21.6	11 22 1.46	-0 6 5.4	12.2	4.7	0.31
8	0 43.0	7 45 51.00	23 4 25.0	6.8	2.5	0.18	23	1 17.7	11 22 5.93	0 15 25.5	12.5	4.7	0.31
9	0 47.7	7 54 31.54	22 43 11.4	6.8	2.6	0.19	24	1 13.6	11 21 51.08	0 21 54.5	12.7	4.8	0.32
10	0 52.2	8 3 1.45	22 20 0.7	6.9	2.6	0.19	25	1 9.1	11 21 16.41	0 25 21.8	12.9	4.9	0.32
11	0 56.6	8 11 20.41	21 55 1.5	6.9	2.6	0.19	26	1 4.2	11 20 21.61	0 25 37.4	13.1	5.0	0.33
12	1 0.7	8 19 28.20	+21 28 22.3	7.0	2.6	0.19	27	0 59.1	11 19 6.57	-0 22 32.3	13.2	5.0	0.33
13	1 4.7	8 27 24.72	21 0 11.4	7.0	2.6	0.19	28	0 53.6	11 17 31.46	0 15 59.0	13.4	5.1	0.34
14	1 8.6	8 35 9.94	20 30 36.8	7.1	2.7	0.19	29	0 47.7	11 15 36.77	-0 5 52.0	13.5	5.1	0.34
15	1 12.2	8 42 43.89	19 59 46.4	7.2	2.7	0.19	30	0 41.5	11 13 23.41	+0 7 51.1	13.7	5.2	0.35
16	1 15.6	8 50 6.66	19 27 47.6	7.2	2.7	0.19	31	0 35.1	11 10 52.71	0 25 8.8	13.8	5.2	0.35
17	1 18.9	8 57 18.35	+18 54 47.5	7.3	2.7	0.19	Sept. 1	0 28.4	11 8 6.54	+0 45 55.6	13.8	5.2	0.35
18	1 21.9	9 4 19.07	18 20 52.8	7.3	2.8	0.20	2	0 21.5	11 5 7.25	1 10 1.6	13.9	5.3	0.35
19	1 24.8	9 11 9.01	17 46 9.8	7.4	2.8	0.20	3	0 14.5	11 1 57.75	1 37 10.8	13.9	5.3	0.35
20	1 27.5	9 17 48.36	17 10 44.6	7.4	2.8	0.20	4	0 7.3	10 58 41.48	2 7 1.7	14.0	5.3	0.35
21	1 30.0	9 24 17.29	16 34 42.9	7.5	2.8	0.20	5	0 0.1	10 55 22.31	2 39 7.3	13.9	5.2	0.35
22	1 32.4	9 30 35.98	+15 58 10.4	7.6	2.9	0.20	6	23 52.9	10 52 4.48	+3 12 55.7	13.8	5.2	0.34
23	1 34.6	9 36 44.60	15 21 12.3	7.7	2.9	0.20	7	23 45.7	10 48 52.45	3 47 50.9	13.7	5.1	0.34
24	1 36.6	9 42 43.30	14 43 53.5	7.8	2.9	0.21	8	23 38.8	10 45 50.85	4 23 13.7	13.6	5.1	0.34
25	1 38.5	9 48 32.25	14 6 18.8	7.9	3.0	0.21	9	23 32.0	10 43 4.21	4 58 23.4	13.4	5.0	0.34
26	1 40.2	9 54 11.57	13 28 32.8	8.0	3.0	0.21	10	23 25.7	10 40 36.85	5 32 39.6	13.2	4.9	0.33
27	1 41.8	9 59 41.38	+12 50 40.0	8.1	3.1	0.21	11	23 19.7	10 38 32.75	+6 5 22.6	12.9	4.8	0.33
28	1 43.1	10 5 1.80	12 12 44.8	8.2	3.1	0.21	12	23 14.2	10 36 55.38	6 35 55.7	12.6	4.7	0.32
29	1 44.3	10 10 12.89	11 34 51.4	8.4	3.1	0.22	13	23 9.1	10 35 47.65	7 3 45.9	12.3	4.6	0.31
30	1 45.4	10 15 14.71	10 57 3.9	8.5	3.2	0.22	14	23 4.5	10 35 11.84	7 28 24.1	11.9	4.5	0.30
31	1 46.4	10 20 7.29	10 19 26.4	8.6	3.2	0.22	15	23 0.6	10 35 9.58	7 49 26.0	11.6	4.4	0.29
Aug. 1	1 47.2	10 24 50.63	+9 42 2.9	8.7	3.3	0.22	16	22 57.2	10 35 41.73	+8 6 32.8	11.2	4.3	0.28
2	1 47.8	10 29 24.69	9 4 57.7	8.8	3.3	0.23	17	22 54.4	10 36 48.62	8 19 30.0	10.9	4.1	0.28
3	1 48.2	10 33 49.41	8 28 14.8	9.0	3.4	0.23	18	22 52.1	10 38 29.85	8 28 7.7	10.5	4.0	0.27
4	1 48.5	10 38 4.71	7 51 58.1	9.1	3.4	0.23	19	22 50.4	10 40 44.56	8 32 20.7	10.2	3.9	0.26
5	1 48.7	10 42 10.47	7 16 11.9	9.2	3.5	0.23	20	22 49.2	10 43 31.35	8 32 7.6	9.9	3.8	0.25
6	1 48.7	10 46 6.51	+6 41 0.8	9.3	3.6	0.24	21	22 48.5	10 46 48.42	+8 27 31.5	9.6	3.7	0.24
7	1 48.5	10 49 52.63	6 6 29.5	9.5	3.6	0.24	22	22 48.3	10 50 33.67	8 18 38.1	9.3	3.5	0.24
8	1 48.2	10 53 28.59	5 32 42.6	9.6	3.7	0.24	23	22 48.6	10 54 44.76	8 5 36.4	9.0	3.4	0.23
9	1 47.7	10 56 54.11	4 59 44.3	9.8	3.7	0.25	24	22 49.3	10 59 19.19	7 48 38.1	8.8	3.3	0.22
10	1 47.0	11 0 8.84	4 27 40.7	10.0	3.8	0.25	25	22 50.3	11 4 14.33	7 27 56.9	8.6	3.2	0.22
11	1 46.1	11 3 12.41	+3 56 37.0	10.1	3.9	0.25	26	22 51.5	11 9 27.61	+7 3 47.9	8.4	3.1	0.21
12	1 45.0	11 6 4.40	3 26 39.0	10.3	3.9	0.26	27	22 53.1	11 14 56.55	6 36 27.8	8.2	3.1	0.21
13	1 43.8	11 8 44.34	2 57 52.9	10.4	4.0	0.26	28	22 54.8	11 20 38.72	6 6 13.9	8.0	3.0	0.20
14	1 42.3	11 11 11.70	2 30 25.6	10.6	4.0	0.27	29	22 56.7	11 26 31.88	5 33 24.0	7.8	2.9	0.20
15	1 40.6	11 13 25.93	2 4 23.9	10.8	4.1	0.27	30	22 58.8	11 32 34.02	4 58 15.5	7.7	2.9	0.20
16	1 38.7	11 15 26.40	+1 39 55.4	11.0	4.2	0.28	31	23 1.0	11 38 43.30	+4 21 5.3	7.5	2.8	0.20
	1 36.5	11 17 12.46	+1 17 8.4	11.2	4.3	0.28		23 3.3	11 44 58.11	+3 42 9.7	7.4	2.8	0.19

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	"		h m	h m s	° ' "	"	"	"
Oct. 1	23 5.7	11 51 17.02	+ 3 1 44.0	7.2	2.7	0.18	Nov. 17	0 52.0	16 39 13.12	-24 19 7.1	6.8	2.6	0.19
2	23 8.1	11 57 38.86	2 20 2.7	7.1	2.7	0.18	18	0 54.3	16 45 31.51	24 34 13.7	6.9	2.6	0.19
3	23 10.5	12 4 2.62	1 37 19.0	7.0	2.6	0.18	19	0 56.7	16 51 48.97	24 48 3.3	7.0	2.6	0.19
4	23 13.0	12 10 27.47	0 53 44.9	6.9	2.6	0.18	20	0 59.0	16 58 5.13	25 0 34.3	7.0	2.7	0.20
5	23 15.5	12 16 52.75	+ 0 9 31.5	6.9	2.6	0.17	21	1 1.3	17 4 19.55	25 11 45.2	7.1	2.7	0.20
6	23 17.9	12 23 17.93	- 0 35 11.4	6.8	2.5	0.17	22	1 3.6	17 10 31.68	-25 21 35.1	7.2	2.7	0.20
7	23 20.4	12 29 42.59	1 20 14.8	6.7	2.5	0.17	23	1 5.8	17 16 40.92	25 30 2.6	7.3	2.7	0.20
8	23 22.8	12 36 6.44	2 5 30.9	6.6	2.5	0.17	24	1 7.8	17 22 46.58	25 37 6.5	7.4	2.8	0.21
9	23 25.3	12 42 29.22	2 50 52.6	6.6	2.5	0.17	25	1 9.9	17 28 47.92	25 42 45.7	7.6	2.8	0.21
10	23 27.7	12 48 50.78	3 36 13.6	6.5	2.4	0.16	26	1 11.9	17 34 44.02	25 46 59.7	7.7	2.9	0.22
11	23 30.1	12 55 11.03	- 4 21 28.3	6.5	2.4	0.16	27	1 13.8	17 40 33.84	-25 49 47.8	7.8	2.9	0.22
12	23 32.5	13 1 29.96	5 6 31.9	6.4	2.4	0.16	28	1 15.6	17 46 16.26	25 51 9.5	7.9	3.0	0.22
13	23 34.8	13 7 47.55	5 51 20.1	6.4	2.4	0.16	29	1 17.2	17 51 49.98	25 51 4.9	8.1	3.0	0.23
14	23 37.1	13 14 3.82	6 35 48.9	6.4	2.4	0.16	30	1 18.7	17 57 13.52	25 49 34.1	8.2	3.1	0.23
15	23 39.4	13 20 18.85	7 19 54.8	6.3	2.4	0.16	Dec. 1	1 19.9	18 2 25.21	25 46 37.8	8.4	3.1	0.24
16	23 41.7	13 26 32.71	- 8 3 34.6	6.3	2.4	0.16	2	1 21.0	18 7 23.16	-25 42 17.5	8.5	3.2	0.24
17	23 44.0	13 32 45.49	8 46 45.6	6.2	2.3	0.16	3	1 21.7	18 12 5.26	25 36 34.6	8.8	3.3	0.25
18	23 46.2	13 38 57.29	9 29 25.3	6.2	2.3	0.16	4	1 22.1	18 16 29.12	25 29 31.0	9.0	3.3	0.26
19	23 48.5	13 45 8.24	10 11 31.5	6.2	2.3	0.16	5	1 22.2	18 20 32.14	25 21 9.6	9.2	3.4	0.26
20	23 50.7	13 51 18.45	10 53 2.1	6.2	2.3	0.16	6	1 21.9	18 24 11.40	25 11 33.9	9.4	3.5	0.27
21	23 52.9	13 57 28.04	-11 33 55.1	6.2	2.3	0.16	7	1 21.2	18 27 23.79	-25 0 48.0	9.6	3.6	0.27
22	23 55.1	14 3 37.16	12 14 8.8	6.2	2.3	0.16	8	1 20.0	18 30 5.88	24 48 56.1	9.9	3.7	0.28
23	23 57.3	14 9 45.93	12 53 41.6	6.2	2.3	0.16	9	1 18.1	18 32 14.12	24 36 3.4	10.1	3.8	0.28
24	23 59.5	14 15 54.47	13 32 31.9	6.2	2.3	0.16	10	1 15.7	18 33 44.88	24 22 15.5	10.4	4.0	0.29
26	0 1.7	14 22 2.91	14 10 38.3	6.2	2.3	0.16	11	1 12.6	18 34 34.55	24 7 38.3	10.7	4.1	0.29
27	0 3.9	14 28 11.37	-14 47 59.4	6.2	2.3	0.16	12	1 8.7	18 34 39.84	-23 52 17.5	11.0	4.2	0.30
28	0 6.1	14 34 19.95	15 24 33.8	6.2	2.3	0.16	13	1 4.1	18 33 57.89	23 36 18.9	11.3	4.3	0.31
29	0 8.3	14 40 28.77	16 0 20.1	6.2	2.3	0.16	14	0 58.7	18 32 26.80	23 19 48.3	11.6	4.4	0.31
30	0 10.5	14 46 37.94	16 35 17.2	6.2	2.3	0.16	15	0 52.4	18 30 5.83	23 2 51.4	11.9	4.5	0.32
31	0 12.7	14 52 47.55	17 9 23.8	6.2	2.3	0.16	16	0 45.3	18 26 55.90	22 45 34.2	12.2	4.6	0.33
Nov. 1	0 14.9	14 58 57.70	-17 42 38.6	6.2	2.3	0.16	17	0 37.5	18 22 59.87	-22 28 3.1	12.5	4.7	0.34
2	0 17.1	15 5 8.46	18 15 0.3	6.2	2.3	0.16	18	0 29.0	18 18 22.71	22 10 26.8	12.7	4.7	0.34
3	0 19.4	15 11 19.91	18 46 27.6	6.2	2.4	0.16	19	0 19.9	18 13 11.82	21 52 56.0	12.9	4.8	0.35
4	0 21.6	15 17 32.08	19 16 59.3	6.3	2.4	0.16	20	0 10.3	18 7 36.42	21 35 44.5	13.0	4.8	0.35
5	0 23.9	15 23 45.02	19 46 34.1	6.3	2.4	0.17	21	0 0.6	18 1 47.26	21 19 9.5	13.1	4.9	0.35
6	0 26.2	15 29 58.77	-20 15 10.6	6.3	2.4	0.17	22	23 50.8	17 55 55.81	-21 3 31.2	13.1	4.9	0.35
7	0 28.5	15 36 13.34	20 42 47.5	6.4	2.4	0.17	23	23 41.3	17 50 13.28	20 49 10.6	12.9	4.8	0.34
8	0 30.8	15 42 28.73	21 9 23.5	6.4	2.4	0.17	23	23 32.0	17 44 50.17	20 36 28.6	12.7	4.8	0.34
9	0 33.1	15 48 44.92	21 34 57.2	6.4	2.4	0.17	24	23 23.1	17 39 55.43	20 25 43.5	12.6	4.7	0.34
10	0 35.4	15 55 1.87	21 59 27.0	6.5	2.5	0.18	25	23 14.9	17 35 35.89	20 17 9.4	12.4	4.7	0.33
11	0 37.8	16 1 19.52	-22 22 51.6	6.5	2.5	0.18	26	23 7.3	17 31 56.31	-20 10 54.9	12.3	4.6	0.33
12	0 40.1	16 7 37.78	22 45 9.6	6.5	2.5	0.18	27	23 0.5	17 28 59.51	20 7 3.3	12.1	4.5	0.32
13	0 42.5	16 13 56.53	23 6 19.3	6.6	2.5	0.18	28	22 54.3	17 26 46.55	20 5 32.3	11.9	4.4	0.32
14	0 44.8	16 20 15.62	23 26 19.5	6.6	2.5	0.18	29	22 48.9	17 25 17.06	20 6 14.9	11.6	4.3	0.31
15	0 47.2	16 26 34.89	23 45 8.6	6.7	2.6	0.19	30	22 44.2	17 24 29.61	20 9 0.6	11.3	4.2	0.31
16	0 49.6	16 32 54.14	-24 2 45.0	6.7	2.6	0.19	31	22 40.1	17 24 22.08	-20 13 36.9	11.0	4.1	0.30
17	0 52.0	16 39 13.12	-24 19 7.1	6.8	2.6	0.19	32	22 36.7	17 24 51.90	-20 19 49.3	10.8	4.0	0.29

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	23 16.7	18 2 7.50	23 27 3.8	5.3	5.1	0.37	Feb. 16	0 16.9	22 3 48.19	13 21 45.8	5.2	5.0	0.34
1	23 18.3	18 7 36.84	23 28 53.0	5.3	5.1	0.37	17	0 17.8	22 8 38.36	12 56 4.2	5.2	5.0	0.34
2	23 19.9	18 13 6.28	23 29 58.6	5.3	5.1	0.37	18	0 18.7	22 13 27.44	12 30 1.8	5.2	5.0	0.34
3	23 21.4	18 18 35.78	23 30 20.4	5.3	5.1	0.37	19	0 19.5	22 18 15.48	12 3 39.1	5.2	5.0	0.34
4	23 23.0	18 24 5.26	23 29 58.5	5.3	5.1	0.37	20	0 20.4	22 23 2.49	11 36 57.0	5.2	5.0	0.34
5	23 24.5	18 29 34.67	23 28 52.9	5.3	5.1	0.37	21	0 21.2	22 27 48.49	11 9 56.3	5.2	5.0	0.34
6	23 26.0	18 35 3.96	23 27 3.6	5.3	5.1	0.37	22	0 22.0	22 32 33.52	10 42 37.9	5.2	5.0	0.34
7	23 27.5	18 40 33.06	23 24 30.6	5.3	5.1	0.37	23	0 22.8	22 37 17.58	10 15 2.5	5.2	5.0	0.34
8	23 29.0	18 46 1.92	23 21 14.1	5.3	5.1	0.37	24	0 23.6	22 42 0.70	9 47 11.0	5.2	5.0	0.34
9	23 30.6	18 51 30.45	23 17 14.1	5.3	5.1	0.37	25	0 24.4	22 46 42.92	9 19 3.9	5.2	5.0	0.34
10	23 32.1	18 56 58.61	23 12 30.7	5.3	5.1	0.37	26	0 25.1	22 51 24.27	8 50 42.2	5.2	5.0	0.34
11	23 33.6	19 2 26.35	23 7 4.2	5.3	5.1	0.37	27	0 25.8	22 56 4.79	8 22 6.6	5.2	5.0	0.34
12	23 35.1	19 7 53.61	23 0 54.7	5.3	5.1	0.37	28	0 26.6	23 0 44.53	7 53 17.8	5.2	5.0	0.34
13	23 36.6	19 13 20.32	22 54 2.6	5.2	5.1	0.37	Mar. 1	0 27.2	23 5 23.50	7 24 16.5	5.2	5.0	0.34
14	23 38.1	19 18 46.44	22 46 28.2	5.2	5.1	0.37	2	0 27.9	23 10 1.75	6 55 3.7	5.2	5.0	0.34
15	23 39.6	19 24 11.91	22 38 11.6	5.2	5.1	0.36	3	0 28.6	23 14 39.31	6 25 40.0	5.2	5.0	0.33
16	23 41.1	19 29 36.68	22 29 13.4	5.2	5.0	0.36	4	0 29.3	23 19 16.23	5 56 6.2	5.2	5.0	0.33
17	23 42.5	19 35 0.69	22 19 33.8	5.2	5.0	0.36	5	0 29.9	23 23 52.54	5 26 22.9	5.2	5.0	0.33
18	23 44.0	19 40 23.90	22 9 13.3	5.2	5.0	0.36	6	0 30.6	23 28 28.28	4 56 31.0	5.2	5.0	0.33
19	23 45.4	19 45 46.27	21 58 12.4	5.2	5.0	0.36	7	0 31.2	23 33 3.50	4 26 31.1	5.2	5.0	0.33
20	23 46.8	19 51 7.73	21 46 31.4	5.2	5.0	0.36	8	0 31.9	23 37 38.24	3 56 23.9	5.2	5.0	0.33
21	23 48.2	19 56 28.25	21 34 10.8	5.2	5.0	0.36	9	0 32.5	23 42 12.54	3 26 10.2	5.2	5.0	0.33
22	23 49.6	20 1 47.80	21 21 11.3	5.2	5.0	0.36	10	0 33.1	23 46 46.45	2 55 50.7	5.2	5.0	0.33
23	23 51.0	20 7 6.32	21 7 33.4	5.2	5.0	0.36	11	0 33.7	23 51 20.01	2 25 26.3	5.2	5.0	0.33
24	23 52.4	20 12 23.78	20 53 17.6	5.2	5.0	0.36	12	0 34.3	23 55 53.27	1 54 57.6	5.2	5.0	0.33
25	23 53.7	20 17 40.18	20 38 24.5	5.2	5.0	0.36	13	0 34.9	0 0 26.25	1 24 25.2	5.2	5.0	0.33
26	23 55.0	20 22 55.47	20 22 54.6	5.2	5.0	0.36	14	0 35.5	0 4 59.01	0 53 49.9	5.2	5.0	0.33
27	23 56.3	20 28 9.62	20 6 48.7	5.2	5.0	0.36	15	0 36.1	0 9 31.60	0 23 12.6	5.2	5.0	0.33
28	23 57.6	20 33 22.60	19 50 7.3	5.2	5.0	0.35	16	0 36.7	0 14 4.05	0 7 26.0	5.2	5.0	0.33
29	23 58.8	20 38 34.39	19 32 51.2	5.2	5.0	0.35	17	0 37.3	0 18 36.41	0 38 5.4	5.2	5.0	0.34
31	0 0.0	20 43 44.97	19 15 0.9	5.2	5.0	0.35	18	0 37.9	0 23 8.74	1 8 44.7	5.2	5.0	0.34
Feb. 1	0 1.2	20 48 54.34	18 56 37.1	5.2	5.0	0.35	19	0 38.5	0 27 41.07	1 39 23.2	5.2	5.0	0.34
2	0 2.4	20 54 2.49	18 37 40.5	5.2	5.0	0.35	20	0 39.1	0 32 13.44	2 10 0.1	5.2	5.0	0.34
3	0 3.6	20 59 9.40	18 18 11.9	5.2	5.0	0.35	21	0 39.7	0 36 45.87	2 40 34.7	5.2	5.0	0.34
4	0 4.7	21 4 15.08	17 58 11.9	5.2	5.0	0.35	22	0 40.3	0 41 18.42	3 11 6.3	5.2	5.0	0.34
5	0 5.8	21 9 19.52	17 37 41.3	5.2	5.0	0.35	23	0 40.9	0 45 51.13	3 41 34.0	5.2	5.0	0.34
6	0 6.9	21 14 22.72	17 16 40.6	5.2	5.0	0.35	24	0 41.5	0 50 24.04	4 11 57.2	5.2	5.0	0.34
7	0 8.0	21 19 24.68	16 55 10.7	5.2	5.0	0.35	25	0 42.1	0 54 57.19	4 42 15.1	5.2	5.1	0.34
8	0 9.1	21 24 25.41	16 33 12.3	5.2	5.0	0.35	26	0 42.7	0 59 30.62	5 12 26.9	5.2	5.1	0.34
9	0 10.1	21 29 24.92	16 10 45.9	5.2	5.0	0.35	27	0 43.3	1 4 4.36	5 42 32.0	5.2	5.1	0.34
10	0 11.1	21 34 23.22	15 47 52.4	5.2	5.0	0.35	28	0 43.9	1 8 38.46	6 12 29.6	5.3	5.1	0.34
11	0 12.1	21 39 20.30	15 24 32.5	5.2	5.0	0.34	29	0 44.6	1 13 12.96	6 42 18.9	5.3	5.1	0.34
12	0 13.1	21 44 16.19	15 0 47.2	5.2	5.0	0.34	30	0 45.2	1 17 47.89	7 11 59.2	5.3	5.1	0.34
13	0 14.1	21 49 10.92	14 36 37.2	5.2	5.0	0.34	31	0 45.9	1 22 23.29	7 41 29.7	5.3	5.1	0.34
14	0 15.1	21 54 4.49	14 12 3.1	5.2	5.0	0.34	32	0 46.5	1 26 59.20	8 10 49.7	5.3	5.1	0.34
15	0 16.0	21 58 56.90	13 47 5.7	5.2	5.0	0.34	33	0 47.2	1 31 35.67	8 39 58.6	5.3	5.1	0.35
16	0 16.9	22 3 48.19	13 21 45.8	5.2	5.0	0.34	34	0 47.8	1 36 12.73	9 8 55.6	5.3	5.1	0.35

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Apr. 1	0 46.5	1 26 59.20	+ 8 10 49.7	5.3	5.1	0.34	May 17	1 32.8	5 14 43.77	+24 2 25.3	5.8	5.6	0.41
2	0 47.2	1 31 35.67	8 39 58.6	5.3	5.1	0.35	18	1 34.2	5 20 2.24	24 8 5.6	5.8	5.6	0.41
3	0 47.8	1 36 12.73	9 8 55.6	5.3	5.1	0.35	19	1 35.5	5 25 21.17	24 15 4.1	5.8	5.6	0.41
4	0 48.5	1 40 50.41	9 37 40.0	5.3	5.1	0.35	20	1 36.9	5 30 40.52	24 21 20.4	5.8	5.6	0.41
5	0 49.2	1 45 28.76	10 6 11.0	5.3	5.1	0.35	21	1 38.3	5 36 0.24	24 26 54.4	5.8	5.6	0.41
6	0 49.9	1 50 7.82	+10 34 27.9	5.3	5.1	0.35	22	1 39.7	5 41 20.26	+24 31 45.9	5.9	5.6	0.42
7	0 50.6	1 54 47.61	11 2 29.9	5.3	5.1	0.35	23	1 41.1	5 46 40.52	24 35 54.6	5.9	5.7	0.42
8	0 51.3	1 59 28.17	11 30 16.2	5.3	5.1	0.35	24	1 42.5	5 52 0.94	24 39 20.3	5.9	5.7	0.42
9	0 52.1	2 4 9.53	11 57 46.1	5.3	5.1	0.35	25	1 43.9	5 57 21.46	24 42 2.7	5.9	5.7	0.42
10	0 52.9	2 8 51.73	12 24 59.1	5.3	5.2	0.35	26	1 45.3	6 2 42.02	24 44 2.0	5.9	5.7	0.42
11	0 53.7	2 13 34.79	+12 51 54.3	5.3	5.2	0.36	27	1 46.7	6 8 2.55	+24 45 18.1	5.9	5.7	0.42
12	0 54.5	2 18 18.75	13 18 30.9	5.3	5.2	0.36	28	1 48.0	6 13 22.99	24 45 51.1	6.0	5.8	0.42
13	0 55.3	2 23 3.65	13 44 48.2	5.4	5.2	0.36	29	1 49.4	6 18 43.26	24 45 40.7	6.0	5.8	0.43
14	0 56.1	2 27 49.52	14 10 45.3	5.4	5.2	0.36	30	1 50.8	6 24 3.32	24 44 47.1	6.0	5.8	0.43
15	0 56.9	2 32 36.37	14 36 21.5	5.4	5.2	0.36	31	1 52.2	6 29 23.09	24 43 10.2	6.0	5.8	0.43
16	0 57.8	2 37 24.21	+15 1 36.3	5.4	5.2	0.36	June 1	1 53.6	6 34 42.49	+24 40 50.2	6.1	5.8	0.43
17	0 58.7	2 42 13.06	15 26 28.8	5.4	5.2	0.36	2	1 55.0	6 40 1.48	24 37 47.1	6.1	5.9	0.43
18	0 59.6	2 47 2.96	15 50 58.2	5.4	5.2	0.36	3	1 56.3	6 45 20.00	24 34 1.3	6.1	5.9	0.43
19	1 0.5	2 51 53.90	16 15 3.7	5.4	5.2	0.36	4	1 57.7	6 50 37.98	24 29 32.9	6.1	5.9	0.43
20	1 1.4	2 56 45.92	16 38 44.5	5.4	5.2	0.37	5	1 59.0	6 55 55.37	24 24 22.0	6.1	5.9	0.43
21	1 2.3	3 1 39.02	+17 1 59.9	5.4	5.2	0.37	6	2 0.4	7 1 12.11	+24 18 29.0	6.2	6.0	0.44
22	1 3.3	3 6 33.20	17 24 49.2	5.4	5.3	0.37	7	2 1.7	7 6 28.14	24 11 54.0	6.2	6.0	0.44
23	1 4.3	3 11 28.48	17 47 11.7	5.4	5.3	0.37	8	2 3.1	7 11 43.41	24 4 37.3	6.2	6.0	0.44
24	1 5.3	3 16 24.86	18 9 6.5	5.5	5.3	0.37	9	2 4.4	7 16 57.88	23 56 39.1	6.2	6.0	0.44
25	1 6.3	3 21 22.34	18 30 33.0	5.5	5.3	0.37	10	2 5.7	7 22 11.49	23 48 0.0	6.2	6.0	0.44
26	1 7.3	3 26 20.93	+18 51 30.4	5.5	5.3	0.37	11	2 6.9	7 27 24.19	+23 38 40.4	6.3	6.1	0.44
27	1 8.3	3 31 20.62	19 11 58.1	5.5	5.3	0.38	12	2 8.1	7 32 35.94	23 28 40.7	6.3	6.1	0.44
28	1 9.4	3 36 21.41	19 31 55.2	5.5	5.3	0.38	13	2 9.3	7 37 46.68	23 18 1.2	6.3	6.1	0.45
29	1 10.5	3 41 23.28	19 51 21.2	5.5	5.3	0.38	14	2 10.5	7 42 56.37	23 6 42.5	6.3	6.1	0.45
30	1 11.6	3 46 26.23	20 10 15.3	5.5	5.3	0.38	15	2 11.7	7 48 4.96	22 54 44.8	6.4	6.2	0.45
May 1	1 12.7	3 51 30.26	+20 28 36.9	5.5	5.3	0.38	16	2 12.9	7 53 12.42	+22 42 8.9	6.4	6.2	0.45
2	1 13.8	3 56 35.36	20 46 25.2	5.6	5.4	0.38	17	2 14.0	7 58 18.71	22 28 55.1	6.4	6.2	0.45
3	1 15.0	4 1 41.50	21 3 39.7	5.6	5.4	0.39	18	2 15.1	8 3 23.78	22 15 4.2	6.5	6.2	0.45
4	1 16.2	4 6 48.68	21 20 19.8	5.6	5.4	0.39	19	2 16.2	8 8 27.61	22 0 36.5	6.5	6.3	0.45
5	1 17.4	4 11 56.87	21 36 24.9	5.6	5.4	0.39	20	2 17.3	8 13 30.18	21 45 32.7	6.5	6.3	0.45
6	1 18.6	4 17 6.05	+21 51 54.3	5.6	5.4	0.39	21	2 18.3	8 18 31.44	+21 29 53.4	6.5	6.3	0.46
7	1 19.8	4 22 16.19	22 6 47.4	5.6	5.4	0.39	22	2 19.4	8 23 31.37	21 13 39.3	6.6	6.3	0.46
8	1 21.1	4 27 27.27	22 21 3.5	5.6	5.4	0.39	23	2 20.4	8 28 29.94	20 56 50.9	6.6	6.4	0.46
9	1 22.3	4 32 39.26	22 34 42.3	5.6	5.5	0.40	24	2 21.5	8 33 27.13	20 39 29.0	6.6	6.4	0.46
10	1 23.6	4 37 52.13	22 47 43.1	5.7	5.5	0.40	25	2 22.5	8 38 22.92	20 21 34.0	6.7	6.4	0.46
11	1 24.9	4 43 5.85	+23 0 5.6	5.7	5.5	0.40	26	2 23.5	8 43 17.28	+20 3 6.8	6.7	6.5	0.46
12	1 26.2	4 48 20.39	23 11 49.0	5.7	5.5	0.40	27	2 24.4	8 48 10.22	19 44 8.0	6.7	6.5	0.46
13	1 27.5	4 53 35.71	23 22 52.9	5.7	5.5	0.40	28	2 25.4	8 53 1.73	19 24 38.3	6.8	6.5	0.46
14	1 28.8	4 58 51.75	23 33 16.9	5.7	5.5	0.40	29	2 26.3	8 57 51.76	19 4 38.5	6.8	6.6	0.46
15	1 30.1	5 4 8.47	23 43 0.6	5.7	5.5	0.40	30	2 27.2	9 2 40.33	18 44 9.2	6.8	6.6	0.47
16	1 31.5	5 9 25.83	+23 52 3.5	5.8	5.5	0.41	31	2 28.0	9 7 27.43	+18 23 11.1	6.9	6.6	0.47
17	1 32.8	5 14 43.77	+24 0 25.3	5.8	5.6	0.41	32	2 28.8	9 12 13.07	+18 1 44.9	6.9	6.6	0.47

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
July 1	2 28.0	9 7 27.43	+18 23 11.1	6.9	6.6	0.47	Aug. 16	2 44.9	12 25 48.78	- 2 58 45.3	9.2	8.9	0.60
2	2 28.8	9 12 13.07	18 1 44.9	6.9	6.6	0.47	17	2 45.0	12 29 48.62	3 29 16.9	9.3	9.0	0.61
3	2 29.6	9 16 57.25	17 39 51.3	7.0	6.7	0.47	18	2 45.0	12 33 48.10	3 59 44.9	9.4	9.1	0.61
4	2 30.3	9 21 39.97	17 17 31.0	7.0	6.7	0.47	19	2 45.0	12 37 47.23	4 30 8.8	9.5	9.2	0.62
5	2 31.0	9 26 21.24	16 54 44.7	7.0	6.8	0.47	20	2 45.1	12 41 46.05	5 0 28.0	9.6	9.3	0.62
6	2 31.7	9 31 1.08	+16 31 33.0	7.1	6.8	0.48	21	2 45.1	12 45 44.57	- 5 30 41.8	9.7	9.4	0.63
7	2 32.4	9 35 39.49	16 7 56.8	7.1	6.9	0.48	22	2 45.1	12 49 42.81	6 0 49.6	9.8	9.4	0.64
8	2 33.1	9 40 16.48	15 43 56.6	7.2	6.9	0.48	23	2 45.1	12 53 40.78	6 30 50.8	9.8	9.5	0.64
9	2 33.7	9 44 52.06	15 19 33.3	7.2	7.0	0.48	24	2 45.2	12 57 38.50	7 0 44.7	9.9	9.6	0.65
10	2 34.3	9 49 26.26	14 54 47.4	7.2	7.0	0.48	25	2 45.2	13 1 35.99	7 30 30.7	10.0	9.7	0.65
11	2 34.9	9 53 59.10	+14 29 39.6	7.3	7.0	0.48	26	2 45.2	13 5 33.26	- 8 0 8.1	10.1	9.8	0.66
12	2 35.5	9 58 30.59	14 4 10.7	7.3	7.1	0.49	27	2 45.2	13 9 30.31	8 29 36.2	10.1	9.8	0.66
13	2 36.1	10 3 0.75	13 38 21.5	7.3	7.1	0.49	28	2 45.2	13 13 27.15	8 58 54.5	10.2	9.9	0.67
14	2 36.7	10 7 29.60	13 12 12.6	7.4	7.2	0.49	29	2 45.2	13 17 23.80	9 28 2.4	10.3	10.0	0.68
15	2 37.2	10 11 57.17	12 45 44.7	7.4	7.2	0.49	30	2 45.2	13 21 20.26	9 56 59.5	10.4	10.1	0.69
16	2 37.7	10 16 23.46	+12 18 58.6	7.5	7.3	0.49	31	2 45.2	13 25 16.54	-10 25 45.2	10.5	10.2	0.70
17	2 38.2	10 20 48.51	11 51 54.9	7.5	7.3	0.50	Sept. 1	2 45.2	13 29 12.67	10 54 18.8	10.6	10.2	0.70
18	2 38.7	10 25 12.34	11 24 34.4	7.6	7.3	0.50	2	2 45.2	13 33 8.64	11 22 39.7	10.7	10.3	0.71
19	2 39.1	10 29 34.96	10 56 57.8	7.6	7.4	0.50	3	2 45.2	13 37 4.45	11 50 47.3	10.8	10.4	0.72
20	2 39.5	10 33 56.40	10 29 5.7	7.7	7.4	0.50	4	2 45.2	13 41 0.12	12 18 41.0	10.9	10.5	0.73
21	2 39.9	10 38 16.69	+10 0 59.1	7.7	7.4	0.51	5	2 45.2	13 44 55.64	-12 46 20.4	11.0	10.6	0.74
22	2 40.3	10 42 35.85	9 32 38.5	7.8	7.5	0.51	6	2 45.1	13 48 51.01	13 13 44.9	11.1	10.8	0.75
23	2 40.6	10 46 53.90	9 4 4.6	7.8	7.5	0.51	7	2 45.1	13 52 46.25	13 40 53.8	11.2	10.9	0.75
24	2 41.0	10 51 10.88	8 35 18.0	7.9	7.6	0.51	8	2 45.1	13 56 41.35	14 7 46.7	11.4	11.0	0.76
25	2 41.3	10 55 26.80	8 6 19.7	7.9	7.6	0.52	9	2 45.1	14 0 36.29	14 34 23.0	11.5	11.1	0.77
26	2 41.6	10 59 41.67	+ 7 37 10.3	8.0	7.7	0.52	10	2 45.0	14 4 31.07	-15 0 42.0	11.6	11.2	0.78
27	2 41.9	11 3 55.54	7 7 50.4	8.0	7.7	0.52	11	2 45.0	14 8 25.67	15 26 43.1	11.7	11.4	0.79
28	2 42.1	11 8 8.43	6 38 20.8	8.0	7.8	0.52	12	2 45.0	14 12 20.08	15 52 25.9	11.8	11.5	0.80
29	2 42.4	11 12 20.38	6 8 42.1	8.1	7.8	0.53	13	2 45.0	14 16 14.29	16 17 49.8	12.0	11.6	0.81
30	2 42.6	11 16 31.41	5 38 54.9	8.1	7.9	0.53	14	2 44.9	14 20 8.26	16 42 54.2	12.1	11.7	0.82
31	2 42.8	11 20 41.55	+ 5 9 0.0	8.2	7.9	0.53	15	2 44.9	14 24 1.98	-17 7 38.5	12.2	11.8	0.83
Aug. 1	2 43.1	11 24 50.82	4 38 58.0	8.2	8.0	0.54	16	2 44.8	14 27 55.41	17 32 2.2	12.4	12.0	0.84
2	2 43.3	11 28 59.26	4 8 49.5	8.3	8.0	0.54	17	2 44.8	14 31 48.50	17 56 4.7	12.5	12.1	0.85
3	2 43.5	11 33 6.92	3 38 35.0	8.3	8.1	0.54	18	2 44.7	14 35 41.20	18 19 45.4	12.6	12.2	0.87
4	2 43.7	11 37 13.81	3 8 15.3	8.4	8.1	0.55	19	2 44.7	14 39 33.49	18 43 3.7	12.8	12.4	0.88
5	2 43.9	11 41 19.97	+ 2 37 51.0	8.5	8.2	0.55	20	2 44.6	14 43 25.29	-19 5 59.1	12.9	12.5	0.89
6	2 44.0	11 45 25.44	2 7 22.7	8.5	8.2	0.55	21	2 44.5	14 47 16.56	19 28 31.3	13.1	12.7	0.90
7	2 44.1	11 49 30.24	1 36 51.0	8.6	8.3	0.56	22	2 44.4	14 51 7.24	19 50 39.6	13.2	12.8	0.91
8	2 44.2	11 53 34.42	1 6 16.7	8.7	8.4	0.56	23	2 44.3	14 54 57.26	20 12 23.4	13.4	12.9	0.93
9	2 44.3	11 57 38.00	0 35 39.8	8.7	8.4	0.57	24	2 44.2	14 58 46.55	20 33 42.4	13.5	13.1	0.94
10	2 44.4	12 1 41.00	+ 0 5 1.7	8.8	8.5	0.57	25	2 44.0	15 2 35.04	-20 54 36.0	13.7	13.2	0.96
11	2 44.5	12 5 43.46	- 0 25 37.3	8.9	8.6	0.58	26	2 43.9	15 6 22.65	21 15 3.7	13.8	13.4	0.97
12	2 44.6	12 9 45.42	0 56 16.6	9.0	8.6	0.58	27	2 43.7	15 10 9.31	21 35 5.1	14.0	13.5	0.98
13	2 44.7	12 13 46.90	1 26 55.8	9.1	8.7	0.58	28	2 43.5	15 13 54.94	21 54 39.7	14.2	13.7	1.00
14	2 44.8	12 17 47.94	1 57 34.0	9.1	8.8	0.59	29	2 43.3	15 17 39.43	22 13 47.1	14.4	13.9	1.01
15	2 44.9	12 21 48.56	- 2 28 10.8	9.2	8.8	0.59	30	2 43.1	15 21 22.70	-22 32 26.9	14.6	14.0	1.03
16	2 44.9	12 25 48.78	- 2 58 45.3	9.2	8.9	0.60	31	2 42.9	15 25 4.65	-22 50 38.8	14.8	14.2	1.04

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	"		h m	h m s	° ' "	"	"	"
Oct. 1	2 42.9	15 25 4.65	22 50 38.8	14.8	14.2	1.04	Nov. 16	1 16.6	16 59 53.93	26 54 55.1	29.7	28.7	2.17
2	2 42.6	15 28 45.16	23 8 22.4	15.0	14.4	1.06	17	1 11.7	16 58 52.58	26 44 29.6	30.1	29.1	2.19
3	2 42.3	15 32 24.15	23 25 37.2	15.1	14.6	1.08	18	1 6.6	16 57 41.16	26 33 11.8	30.5	29.5	2.21
4	2 42.0	15 36 1.52	23 42 22.9	15.3	14.8	1.10	19	1 1.3	16 56 19.94	26 21 1.0	30.8	29.8	2.23
5	2 41.6	15 39 37.14	23 58 39.4	15.5	15.0	1.11	20	0 55.8	16 54 49.31	26 7 57.4	31.2	30.2	2.25
6	2 41.2	15 43 10.90	24 14 26.2	15.8	15.2	1.13	21	0 50.2	16 53 9.74	25 54 1.1	31.6	30.5	2.27
7	2 40.8	15 46 42.66	24 29 43.0	16.0	15.4	1.14	22	0 44.5	16 51 21.75	25 39 12.9	31.9	30.8	2.29
8	2 40.4	15 50 12.28	24 44 29.5	16.2	15.6	1.16	23	0 38.6	16 49 25.99	25 23 33.9	32.2	31.1	2.31
9	2 39.9	15 53 39.62	24 58 45.4	16.4	15.8	1.18	24	0 32.6	16 47 23.19	25 7 5.8	32.4	31.3	2.32
10	2 39.4	15 57 4.51	25 12 30.4	16.7	16.1	1.20	25	0 26.5	16 45 14.15	24 49 50.9	32.6	31.5	2.33
11	2 38.8	16 0 26.81	25 25 44.4	16.9	16.3	1.22	26	0 20.4	16 42 59.72	24 31 52.1	32.8	31.7	2.34
12	2 38.2	16 3 46.35	25 38 26.9	17.2	16.6	1.24	27	0 14.2	16 40 40.86	24 13 12.8	33.0	31.9	2.34
13	2 37.5	16 7 2.93	25 50 37.8	17.4	16.8	1.26	28	0 7.9	16 38 18.56	23 53 57.0	33.2	31.9	2.34
14	2 36.7	16 10 16.38	26 2 16.9	17.7	17.0	1.28	29	0 1.5	16 35 53.87	23 34 9.2	33.3	32.0	2.33
15	2 35.9	16 13 26.49	26 13 23.9	17.9	17.3	1.30	29	23 55.2	16 33 27.83	23 13 54.9	33.3	32.1	2.33
16	2 35.1	16 16 33.05	26 23 58.7	18.2	17.5	1.33	30	23 48.9	16 31 1.53	22 53 19.4	33.4	32.2	2.32
17	2 34.2	16 19 35.84	26 34 0.9	18.5	17.8	1.35	Dec. 1	23 42.5	16 28 36.04	22 32 28.7	33.4	32.2	2.32
18	2 33.3	16 22 34.63	26 43 30.4	18.8	18.1	1.37	2	23 36.2	16 26 12.41	22 11 29.3	33.3	32.1	2.31
19	2 32.3	16 25 29.19	26 52 26.9	19.1	18.4	1.39	3	23 29.9	16 23 51.62	21 50 27.6	33.2	31.9	2.29
20	2 31.2	16 28 19.27	27 0 50.2	19.4	18.7	1.42	4	23 23.7	16 21 34.63	21 29 30.3	33.0	31.8	2.28
21	2 30.0	16 31 4.61	27 8 40.2	19.7	19.0	1.44	5	23 17.5	16 19 22.37	21 8 43.6	32.9	31.7	2.26
22	2 28.8	16 33 44.95	27 15 56.7	20.0	19.3	1.47	6	23 11.4	16 17 15.68	20 48 14.2	32.8	31.6	2.24
23	2 27.4	16 36 20.00	27 22 39.4	20.3	19.6	1.49	7	23 5.5	16 15 15.34	20 28 8.3	32.6	31.4	2.22
24	2 25.9	16 38 49.49	27 28 48.1	20.6	19.9	1.52	8	22 59.7	16 13 22.02	20 8 31.6	32.3	31.2	2.19
25	2 24.4	16 41 13.15	27 34 22.5	21.0	20.3	1.54	9	22 54.0	16 11 36.30	19 49 29.5	32.0	30.9	2.17
26	2 22.8	16 43 30.68	27 39 22.3	21.3	20.6	1.57	10	22 48.4	16 9 58.70	19 31 6.9	31.7	30.6	2.14
27	2 21.0	16 45 41.80	27 43 47.2	21.7	20.9	1.59	11	22 42.9	16 8 29.67	19 13 28.2	31.4	30.3	2.12
28	2 19.2	16 47 46.21	27 47 36.8	22.0	21.2	1.62	12	22 37.7	16 7 9.61	18 56 37.5	31.1	30.0	2.09
29	2 17.3	16 49 43.62	27 50 50.8	22.4	21.6	1.65	13	22 32.6	16 5 58.76	18 40 38.6	30.7	29.7	2.06
30	2 15.2	16 51 33.74	27 53 28.9	22.7	21.9	1.68	14	22 27.7	16 4 57.35	18 25 33.9	30.3	29.3	2.03
31	2 13.0	16 53 16.27	27 55 30.4	23.1	22.3	1.71	15	22 22.9	16 4 5.53	18 11 25.6	29.9	28.9	2.00
Nov. 1	2 10.6	16 54 50.92	27 56 54.9	23.5	22.7	1.74	16	22 18.3	16 3 23.41	17 58 15.4	29.5	28.5	1.97
2	2 8.1	16 56 17.40	27 57 41.8	23.9	23.1	1.76	17	22 13.9	16 2 51.05	17 46 4.6	29.1	28.1	1.94
3	2 5.4	16 57 35.43	27 57 50.4	24.3	23.5	1.79	18	22 9.6	16 2 28.44	17 34 54.0	28.7	27.7	1.91
4	2 2.6	16 58 44.72	27 57 20.0	24.7	23.9	1.82	19	22 5.4	16 2 15.55	17 24 43.8	28.3	27.2	1.88
5	1 59.7	16 59 45.01	27 56 9.9	25.1	24.2	1.85	20	22 1.5	16 2 12.29	17 15 33.7	27.8	26.8	1.85
6	1 56.6	17 0 36.03	27 54 19.2	25.5	24.6	1.88	21	21 57.6	16 2 18.59	17 7 23.6	27.4	26.4	1.82
7	1 53.4	17 1 17.53	27 51 46.9	25.9	25.0	1.91	22	21 54.0	16 2 34.30	17 0 12.5	27.0	26.0	1.79
8	1 50.0	17 1 49.28	27 48 32.1	26.3	25.4	1.94	23	21 50.5	16 2 59.25	16 53 59.2	26.6	25.6	1.76
9	1 46.4	17 2 11.08	27 44 33.9	26.8	25.8	1.97	24	21 47.1	16 3 33.28	16 48 42.4	26.1	25.2	1.73
10	1 42.6	17 2 22.75	27 39 51.1	27.2	26.3	2.00	25	21 43.8	16 4 16.22	16 44 20.6	25.7	24.8	1.70
11	1 38.7	17 2 24.13	27 34 22.5	27.7	26.7	2.03	26	21 40.7	16 5 7.87	16 40 51.9	25.3	24.4	1.67
12	1 34.7	17 2 15.09	27 28 7.1	28.1	27.1	2.06	27	21 37.8	16 6 8.01	16 38 14.4	24.9	24.0	1.64
13	1 30.5	17 1 55.56	27 21 3.8	28.5	27.5	2.09	28	21 35.0	16 7 16.41	16 36 26.1	24.5	23.6	1.61
14	1 26.0	17 1 25.52	27 13 11.4	28.9	27.9	2.12	29	21 32.3	16 8 32.87	16 35 24.7	24.0	23.2	1.58
15	1 21.4	17 0 44.95	27 4 28.9	29.3	28.3	2.14	30	21 29.8	16 9 57.15	16 35 7.9	23.6	22.8	1.56
16	1 16.6	16 59 53.93	26 54 55.1	29.7	28.7	2.17	31	21 27.4	16 11 29.00	16 35 33.2	23.2	22.4	1.54



## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T.of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T.of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Oct. 1	18 28.7	7 13 30.95	+23 1 55.9	6.9	4.0	0.29	Nov. 16	16 48.3	8 34 15.13	+20 49 14.7	9.3	5.3	0.39
2	18 27.0	7 15 46.64	22 59 20.5	6.9	4.0	0.29	17	16 45.5	8 35 19.04	20 47 45.0	9.4	5.4	0.39
3	18 25.3	7 18 1.30	22 56 40.7	6.9	4.0	0.29	18	16 42.6	8 36 20.63	20 46 23.6	9.4	5.4	0.39
4	18 23.6	7 20 14.92	22 53 56.6	7.0	4.0	0.29	19	16 39.6	8 37 19.88	20 45 10.8	9.5	5.5	0.40
5	18 21.9	7 22 27.47	22 51 8.5	7.0	4.0	0.30	20	16 36.6	8 38 16.76	20 44 7.0	9.6	5.5	0.40
6	18 20.1	7 24 38.94	+22 48 16.5	7.0	4.1	0.30	21	16 33.6	8 39 11.21	+20 43 12.5	9.7	5.6	0.40
7	18 18.3	7 26 49.31	22 45 20.9	7.1	4.1	0.30	22	16 30.5	8 40 3.17	20 42 27.6	9.7	5.6	0.41
8	18 16.6	7 28 58.55	22 42 21.9	7.1	4.1	0.30	23	16 27.4	8 40 52.64	20 41 52.4	9.8	5.7	0.41
9	18 14.8	7 31 6.63	22 39 19.9	7.1	4.1	0.30	24	16 24.3	8 41 39.58	20 41 27.3	9.9	5.7	0.41
10	18 13.0	7 33 13.54	22 36 15.0	7.2	4.2	0.30	25	16 21.1	8 42 23.93	20 41 12.6	10.0	5.8	0.41
11	18 11.1	7 35 19.25	+22 33 7.5	7.2	4.2	0.30	26	16 17.8	8 43 5.64	+20 41 8.6	10.1	5.8	0.42
12	18 9.2	7 37 23.73	22 29 57.7	7.3	4.2	0.30	27	16 14.5	8 43 44.66	20 41 15.5	10.2	5.9	0.42
13	18 7.4	7 39 26.98	22 26 45.9	7.3	4.3	0.31	28	16 11.2	8 44 20.95	20 41 33.6	10.3	5.9	0.42
14	18 5.5	7 41 28.97	22 23 32.3	7.4	4.3	0.31	29	16 7.8	8 44 54.47	20 42 3.2	10.4	6.0	0.43
15	18 3.5	7 43 29.67	22 20 17.0	7.4	4.3	0.31	30	16 4.4	8 45 25.17	20 42 44.5	10.5	6.0	0.43
16	18 1.6	7 45 29.07	+22 17 0.4	7.5	4.4	0.31	Dec. 1	16 1.0	8 45 53.01	+20 43 37.8	10.5	6.1	0.43
17	17 59.6	7 47 27.13	22 13 42.8	7.5	4.4	0.31	2	15 57.4	8 46 17.91	20 44 43.3	10.6	6.1	0.44
18	17 57.6	7 49 23.86	22 10 24.4	7.6	4.4	0.31	3	15 53.8	8 46 39.83	20 46 1.2	10.7	6.2	0.44
19	17 55.6	7 51 19.22	22 7 5.4	7.6	4.4	0.31	4	15 50.2	8 46 58.71	20 47 31.8	10.8	6.2	0.44
20	17 53.6	7 53 13.20	22 3 46.1	7.7	4.5	0.32	5	15 46.6	8 47 14.50	20 49 15.2	10.9	6.3	0.44
21	17 51.5	7 55 5.78	+22 0 26.7	7.7	4.5	0.32	6	15 42.8	8 47 27.14	+20 51 11.6	11.0	6.3	0.45
22	17 49.4	7 56 56.93	21 57 7.6	7.8	4.5	0.32	7	15 39.1	8 47 36.59	20 53 21.1	11.1	6.4	0.45
23	17 47.3	7 58 46.63	21 53 48.8	7.8	4.6	0.32	8	15 35.2	8 47 42.81	20 55 43.8	11.2	6.4	0.45
24	17 45.2	8 0 34.89	21 50 30.9	7.9	4.6	0.32	9	15 31.4	8 47 45.76	20 58 19.9	11.3	6.5	0.46
25	17 43.0	8 2 21.65	21 47 13.8	7.9	4.6	0.33	10	15 27.4	8 47 45.42	21 1 9.4	11.4	6.5	0.46
26	17 40.8	8 4 6.90	+21 43 58.0	8.0	4.6	0.33	11	15 23.4	8 47 41.74	+21 4 12.3	11.5	6.6	0.46
27	17 38.6	8 5 50.63	21 40 43.7	8.0	4.7	0.33	12	15 19.4	8 47 34.70	21 7 28.6	11.5	6.6	0.47
28	17 36.4	8 7 32.80	21 37 31.2	8.1	4.7	0.33	13	15 15.3	8 47 24.25	21 10 58.0	11.6	6.7	0.47
29	17 34.2	8 9 13.39	21 34 20.9	8.1	4.7	0.33	14	15 11.1	8 47 10.37	21 14 40.6	11.7	6.7	0.48
30	17 31.9	8 10 52.38	21 31 13.0	8.2	4.7	0.33	15	15 6.9	8 46 53.05	21 18 36.1	11.8	6.8	0.48
31	17 29.5	8 12 29.73	+21 28 7.7	8.2	4.8	0.34	16	15 2.6	8 46 32.26	+21 22 44.4	11.9	6.8	0.49
Nov. 1	17 27.2	8 14 5.40	21 25 5.4	8.3	4.8	0.34	17	14 58.3	8 46 8.00	21 27 5.3	12.0	6.9	0.49
2	17 24.8	8 15 39.36	21 22 6.5	8.3	4.8	0.34	18	14 53.9	8 45 40.27	21 31 38.4	12.1	6.9	0.49
3	17 22.4	8 17 11.59	21 19 11.2	8.4	4.8	0.35	19	14 49.4	8 45 9.08	21 36 23.6	12.2	7.0	0.50
4	17 20.0	8 18 42.04	21 16 19.9	8.5	4.9	0.35	20	14 44.9	8 44 34.42	21 41 20.5	12.2	7.0	0.50
5	17 17.5	8 20 10.67	+21 13 32.9	8.5	4.9	0.35	21	14 40.4	8 43 56.32	+21 46 28.6	12.3	7.0	0.51
6	17 15.0	8 21 37.44	21 10 50.5	8.6	4.9	0.36	22	14 35.8	8 43 14.78	21 51 47.7	12.4	7.1	0.51
7	17 12.5	8 23 2.33	21 8 13.2	8.7	5.0	0.36	23	14 31.1	8 42 29.83	21 57 17.1	12.5	7.1	0.51
8	17 10.0	8 24 25.33	21 5 41.1	8.8	5.0	0.36	24	14 26.4	8 41 41.46	22 2 56.5	12.6	7.2	0.52
9	17 7.4	8 25 46.36	21 3 14.6	8.8	5.0	0.36	25	14 21.6	8 40 49.73	22 8 45.3	12.6	7.2	0.52
10	17 4.8	8 27 5.36	+21 0 54.2	8.9	5.1	0.37	26	14 16.7	8 39 54.67	+22 14 43.0	12.7	7.2	0.53
11	17 2.1	8 28 22.31	20 58 40.1	8.9	5.1	0.37	27	14 11.8	8 38 56.33	22 20 48.9	12.8	7.3	0.53
12	16 59.4	8 29 37.19	20 56 32.7	9.0	5.1	0.37	28	14 6.8	8 37 54.74	22 27 2.5	12.9	7.3	0.53
13	16 56.7	8 30 49.96	20 54 32.2	9.1	5.2	0.38	29	14 1.8	8 36 49.98	22 33 23.1	12.9	7.3	0.53
14	16 54.0	8 32 0.56	20 52 38.7	9.1	5.2	0.38	30	13 56.8	8 35 42.09	22 39 49.9	13.0	7.4	0.54
15	16 51.2	8 33 8.96	+20 50 52.7	9.2	5.3	0.38	31	13 51.7	8 34 31.15	+22 46 22.3	13.0	7.4	0.54
16	16 48.3	8 34 15.13	+20 49 14.7	9.2	5.3	0.39	32	13 46.5	8 33 17.24	+22 52 59.5	13.1	7.5	0.54

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	17 52.3	12 36 49.85	-2 32 20.5	1.7	17.6	1.25	Feb. 15	14 51.9	12 37 12.39	-2 21 43.6	1.9	20.1	1.43
1	17 48.7	12 37 5.49	2 33 43.7	1.7	17.7	1.25	16	14 47.7	12 36 57.05	2 19 50.7	1.9	20.2	1.44
2	17 45.0	12 37 20.50	2 35 2.7	1.7	17.7	1.25	17	14 43.5	12 36 41.09	2 17 54.1	1.9	20.2	1.44
3	17 41.3	12 37 34.88	2 36 17.7	1.7	17.8	1.26	18	14 39.3	12 36 24.53	2 15 53.9	1.9	20.3	1.44
4	17 37.6	12 37 48.62	2 37 28.6	1.7	17.9	1.26	19	14 35.1	12 36 7.38	2 13 50.1	1.9	20.3	1.44
5	17 33.9	12 38 1.72	-2 38 35.2	1.7	17.9	1.27	20	14 30.8	12 35 49.65	-2 11 42.8	1.9	20.4	1.45
6	17 30.1	12 38 14.17	2 39 37.7	1.7	18.0	1.27	21	14 26.6	12 35 31.34	2 9 32.0	1.9	20.4	1.45
7	17 26.4	12 38 25.98	2 40 35.9	1.7	18.1	1.28	22	14 22.3	12 35 12.48	2 7 18.0	1.9	20.5	1.45
8	17 22.7	12 38 37.13	2 41 29.9	1.7	18.1	1.28	23	14 18.1	12 34 53.09	2 5 0.8	1.9	20.5	1.45
9	17 18.9	12 38 47.63	2 42 19.7	1.7	18.2	1.28	24	14 13.8	12 34 33.17	2 2 40.4	1.9	20.6	1.46
10	17 15.2	12 38 57.46	-2 43 5.0	1.7	18.2	1.29	25	14 9.5	12 34 12.71	-2 0 16.9	1.9	20.6	1.46
11	17 11.4	12 39 6.63	2 43 46.1	1.7	18.3	1.29	26	14 5.3	12 33 51.75	1 57 50.5	1.9	20.6	1.46
12	17 7.6	12 39 15.11	2 44 22.9	1.7	18.3	1.30	27	14 1.0	12 33 30.31	1 55 21.3	1.9	20.7	1.46
13	17 3.8	12 39 22.92	2 44 55.2	1.7	18.4	1.30	28	13 56.7	12 33 8.41	1 52 49.2	1.9	20.7	1.47
14	17 0.0	12 39 30.05	2 45 23.2	1.7	18.4	1.30	Mar. 1	13 52.4	12 32 46.04	1 50 14.4	1.9	20.7	1.47
15	16 56.2	12 39 36.52	-2 45 46.7	1.7	18.5	1.31	2	13 48.1	12 32 23.22	-1 47 37.2	2.0	20.7	1.47
16	16 52.3	12 39 42.29	2 46 5.8	1.7	18.5	1.31	3	13 43.8	12 31 59.97	1 44 57.6	2.0	20.8	1.47
17	16 48.4	12 39 47.38	2 46 20.4	1.7	18.6	1.32	4	13 39.4	12 31 36.30	1 42 15.5	2.0	20.8	1.48
18	16 44.6	12 39 51.76	2 46 30.7	1.7	18.6	1.32	5	13 35.1	12 31 12.24	1 39 31.2	2.0	20.8	1.48
19	16 40.7	12 39 55.43	2 46 36.5	1.7	18.7	1.33	6	13 30.7	12 30 47.79	1 36 44.9	2.0	20.9	1.48
20	16 36.8	12 39 58.40	-2 46 37.7	1.8	18.8	1.33	7	13 26.4	12 30 22.98	-1 33 56.4	2.0	20.9	1.48
21	16 32.9	12 40 0.66	2 46 34.6	1.8	18.8	1.34	8	13 22.1	12 29 57.82	1 31 6.0	2.0	20.9	1.48
22	16 29.0	12 40 2.22	2 46 26.9	1.8	18.9	1.34	9	13 17.7	12 29 32.33	1 28 13.7	2.0	20.9	1.49
23	16 25.1	12 40 3.08	2 46 14.8	1.8	19.0	1.35	10	13 13.3	12 29 6.51	1 25 19.8	2.0	21.0	1.49
24	16 21.2	12 40 3.23	2 45 58.1	1.8	19.0	1.35	11	13 9.0	12 28 40.39	1 22 24.3	2.0	21.0	1.49
25	16 17.3	12 40 2.69	-2 45 37.0	1.8	19.1	1.35	12	13 4.6	12 28 13.99	-1 19 27.2	2.0	21.0	1.49
26	16 13.3	12 40 1.44	2 45 11.5	1.8	19.1	1.36	13	13 0.2	12 27 47.31	1 16 28.8	2.0	21.0	1.49
27	16 9.4	12 39 59.48	2 44 41.7	1.8	19.2	1.36	14	12 55.9	12 27 20.39	1 13 29.3	2.0	21.0	1.49
28	16 5.4	12 39 56.83	2 44 7.4	1.8	19.2	1.37	15	12 51.5	12 26 53.24	1 10 28.6	2.0	21.0	1.49
29	16 1.4	12 39 53.48	2 43 28.7	1.8	19.3	1.37	16	12 47.1	12 26 25.88	1 7 26.7	2.0	21.0	1.49
30	15 57.4	12 39 49.42	-2 42 45.7	1.8	19.3	1.37	17	12 42.7	12 25 58.33	-1 4 24.0	2.0	21.1	1.50
31	15 53.4	12 39 44.67	2 41 58.3	1.8	19.4	1.38	18	12 38.3	12 25 30.60	1 1 20.7	2.0	21.1	1.50
Feb. 1	15 49.4	12 39 39.22	2 41 6.5	1.8	19.4	1.38	19	12 33.9	12 25 2.72	0 58 16.8	2.0	21.1	1.50
2	15 45.3	12 39 33.10	2 40 10.4	1.8	19.5	1.38	20	12 29.5	12 24 34.72	0 55 12.2	2.0	21.1	1.50
3	15 41.3	12 39 26.29	2 39 10.1	1.8	19.5	1.39	21	12 25.1	12 24 6.60	0 52 7.4	2.0	21.1	1.50
4	15 37.2	12 39 18.79	-2 38 5.6	1.8	19.6	1.39	22	12 20.7	12 23 38.38	-0 49 2.5	2.0	21.1	1.50
5	15 33.1	12 39 10.61	2 36 56.8	1.8	19.6	1.39	23	12 16.3	12 23 10.09	0 45 57.5	2.0	21.1	1.50
6	15 29.1	12 39 1.76	2 35 43.8	1.9	19.7	1.40	24	12 11.9	12 22 41.77	0 42 52.5	2.0	21.1	1.50
7	15 25.0	12 38 52.24	2 34 26.6	1.9	19.7	1.40	25	12 7.5	12 22 13.42	0 39 47.9	2.0	21.1	1.50
8	15 20.9	12 38 42.04	2 33 5.3	1.9	19.8	1.41	26	12 3.1	12 21 45.06	0 36 43.8	2.0	21.1	1.50
9	15 16.8	12 38 31.18	-2 31 39.8	1.9	19.8	1.41	27	11 58.7	12 21 16.71	-0 33 40.1	2.0	21.1	1.50
10	15 12.6	12 38 19.66	2 30 10.4	1.9	19.9	1.41	28	11 54.3	12 20 48.41	0 30 36.8	2.0	21.1	1.50
11	15 8.5	12 38 7.50	2 28 36.9	1.9	19.9	1.42	29	11 49.9	12 20 20.15	0 27 34.3	2.0	21.1	1.50
12	15 4.4	12 37 54.68	2 26 59.4	1.9	20.0	1.42	30	11 45.5	12 19 51.97	0 24 32.9	2.0	21.1	1.50
13	15 0.2	12 37 41.20	2 25 17.9	1.9	20.0	1.42	31	11 41.1	12 19 23.88	0 21 32.5	2.0	21.1	1.50
14	14 56.0	12 37 27.10	-2 23 32.6	1.9	20.1	1.43	Apr. 1	11 36.7	12 18 55.92	-0 18 33.1	2.0	21.1	1.50
15	14 51.9	12 37 12.39	-2 21 43.6	1.9	20.1	1.43	2	11 32.3	12 18 28.08	-0 15 35.0	2.0	21.1	1.50

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Apr. 1	11 36.7	12 18 55.92	-0 18 33.1	2.0	21.1	1.50	May 16	8 25.1	12 4 14.12	+1 9 24.6	1.8	19.6	1.39
2	11 32.3	12 18 28.08	0 15 35.0	2.0	21.1	1.50	17	8 21.1	12 4 7.11	1 9 54.7	1.8	19.5	1.39
3	11 27.9	12 18 0.39	0 12 38.4	2.0	21.0	1.50	18	8 17.1	12 4 0.75	1 10 20.5	1.8	19.5	1.38
4	11 23.5	12 17 32.88	0 9 43.3	2.0	21.0	1.50	19	8 13.0	12 3 55.04	1 10 42.0	1.8	19.4	1.38
5	11 19.1	12 17 5.56	0 6 49.6	2.0	21.0	1.50	20	8 9.0	12 3 49.98	1 10 59.0	1.8	19.3	1.37
6	11 14.8	12 16 38.45	-0 3 57.6	2.0	21.0	1.50	21	8 5.0	12 3 45.59	+1 11 11.6	1.8	19.3	1.37
7	11 10.4	12 16 11.55	-0 1 7.6	2.0	21.0	1.49	22	8 1.0	12 3 41.88	1 11 19.8	1.8	19.2	1.37
8	11 6.0	12 15 44.89	+0 1 40.5	2.0	21.0	1.49	23	7 57.0	12 3 38.84	1 11 23.6	1.8	19.1	1.36
9	11 1.6	12 15 18.48	0 4 26.6	2.0	21.0	1.49	24	7 53.0	12 3 36.45	1 11 23.1	1.8	19.1	1.36
10	10 57.3	12 14 52.36	0 7 10.6	2.0	21.0	1.49	25	7 49.1	12 3 34.73	1 11 18.3	1.8	19.0	1.36
11	10 52.9	12 14 26.52	+0 9 52.3	2.0	20.9	1.49	26	7 45.2	12 3 33.66	+1 11 9.0	1.8	19.0	1.35
12	10 48.6	12 14 0.99	0 12 31.6	2.0	20.9	1.48	27	7 41.2	12 3 33.26	1 10 55.3	1.8	18.9	1.35
13	10 44.2	12 13 35.78	0 15 8.5	2.0	20.9	1.48	28	7 37.3	12 3 33.52	1 10 37.3	1.8	18.9	1.34
14	10 39.9	12 13 10.91	0 17 42.8	2.0	20.9	1.48	29	7 33.4	12 3 34.44	1 10 15.0	1.8	18.8	1.34
15	10 35.6	12 12 46.40	0 20 14.3	2.0	20.9	1.48	30	7 29.5	12 3 36.02	1 9 48.4	1.8	18.8	1.34
16	10 31.2	12 12 22.27	+0 22 43.0	2.0	20.8	1.47	31	7 25.6	12 3 38.27	+1 9 17.5	1.8	18.7	1.33
17	10 26.9	12 11 58.52	0 25 8.9	2.0	20.8	1.47	June 1	7 21.7	12 3 41.16	1 8 42.4	1.8	18.7	1.33
18	10 22.6	12 11 35.18	0 27 37.9	1.9	20.8	1.47	2	7 17.8	12 3 44.69	1 8 3.2	1.8	18.6	1.33
19	10 18.3	12 11 12.27	0 29 51.8	1.9	20.7	1.47	3	7 13.9	12 3 48.87	1 7 19.7	1.8	18.6	1.32
20	10 14.0	12 10 49.79	0 32 8.6	1.9	20.7	1.46	4	7 10.1	12 3 53.70	1 6 32.0	1.8	18.5	1.32
21	10 9.7	12 10 27.75	+0 34 22.2	1.9	20.7	1.46	5	7 6.2	12 3 59.16	+1 5 40.2	1.8	18.5	1.31
22	10 5.4	12 10 6.18	0 36 32.3	1.9	20.6	1.46	6	7 2.4	12 4 5.26	1 4 44.3	1.7	18.4	1.31
23	10 1.1	12 9 45.10	0 38 38.9	1.9	20.6	1.46	7	6 58.6	12 4 11.99	1 3 44.2	1.7	18.4	1.31
24	9 56.8	12 9 24.51	0 40 42.0	1.9	20.6	1.45	8	6 54.8	12 4 19.36	1 2 40.0	1.7	18.3	1.30
25	9 52.5	12 9 4.41	0 42 41.7	1.9	20.5	1.45	9	6 51.0	12 4 27.36	1 1 31.6	1.7	18.3	1.30
26	9 48.3	12 8 44.83	+0 44 37.8	1.9	20.5	1.45	10	6 47.2	12 4 35.99	+1 0 19.2	1.7	18.2	1.30
27	9 44.0	12 8 25.77	0 46 30.1	1.9	20.4	1.45	11	6 43.4	12 4 45.23	0 59 2.8	1.7	18.2	1.29
28	9 39.8	12 8 7.24	0 48 18.6	1.9	20.4	1.44	12	6 39.7	12 4 55.09	0 57 42.4	1.7	18.1	1.29
29	9 35.6	12 7 49.27	0 50 3.3	1.9	20.3	1.44	13	6 35.9	12 5 5.58	0 56 18.1	1.7	18.1	1.29
30	9 31.3	12 7 31.85	0 51 44.2	1.9	20.3	1.44	14	6 32.2	12 5 16.68	0 54 50.0	1.7	18.0	1.28
May 1	9 27.1	12 7 15.00	+0 53 21.1	1.9	20.3	1.44	15	6 28.4	12 5 28.38	+0 53 17.9	1.7	18.0	1.28
2	9 22.9	12 6 58.72	0 54 54.1	1.9	20.2	1.43	16	6 24.7	12 5 40.70	0 51 41.9	1.7	17.9	1.27
3	9 18.7	12 6 43.00	0 56 23.2	1.9	20.2	1.43	17	6 21.0	12 5 53.63	0 50 1.9	1.7	17.9	1.27
4	9 14.5	12 6 27.88	0 57 48.1	1.9	20.2	1.43	18	6 17.3	12 6 7.15	0 48 18.2	1.7	17.8	1.27
5	9 10.4	12 6 13.35	0 59 9.1	1.9	20.1	1.43	19	6 13.6	12 6 21.26	0 46 30.6	1.7	17.8	1.26
6	9 6.2	12 5 59.41	+1 0 26.0	1.9	20.1	1.42	20	6 9.9	12 6 35.96	+0 44 39.2	1.7	17.7	1.26
7	9 2.1	12 5 46.07	1 1 38.9	1.9	20.1	1.42	21	6 6.2	12 6 51.25	0 42 44.0	1.6	17.7	1.25
8	8 57.9	12 5 33.34	1 2 47.8	1.9	20.0	1.42	22	6 2.6	12 7 7.12	0 40 45.3	1.6	17.6	1.25
9	8 53.8	12 5 21.23	1 3 52.4	1.9	20.0	1.42	23	5 58.9	12 7 23.57	0 38 42.9	1.6	17.6	1.25
10	8 49.7	12 5 9.75	1 4 52.7	1.9	19.9	1.41	24	5 55.2	12 7 40.59	0 36 36.8	1.6	17.5	1.24
11	8 45.5	12 4 58.89	+1 5 48.8	1.9	19.9	1.41	25	5 51.6	12 7 58.17	+0 34 27.2	1.6	17.5	1.24
12	8 41.4	12 4 48.64	1 6 40.6	1.8	19.8	1.41	26	5 48.0	12 8 16.30	0 32 14.1	1.6	17.4	1.24
13	8 37.4	12 4 39.04	1 7 28.1	1.8	19.8	1.40	27	5 44.4	12 8 34.99	0 29 57.5	1.6	17.4	1.23
14	8 33.3	12 4 30.09	1 8 11.2	1.8	19.7	1.40	28	5 40.8	12 8 54.23	0 27 37.4	1.6	17.3	1.23
15	8 29.2	12 4 21.78	1 8 50.1	1.8	19.7	1.40	29	5 37.2	12 9 14.01	0 25 13.8	1.6	17.3	1.23
16	8 25.1	12 4 14.12	+1 9 24.6	1.8	19.6	1.39	30	5 33.6	12 9 34.32	+0 22 47.0	1.6	17.2	1.22
17	8 21.1	12 4 7.11	+1 9 54.7	1.8	19.5	1.39	July 1	5 30.0	12 9 55.15	+0 20 16.9	1.6	17.2	1.22

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Mar. 1	18 1.8	16 42 52.96	-20 26 17.4	0.9	7.8	0.60	Apr. 16	14 59.9	16 41 48.56	-20 18 47.9	0.9	8.4	0.64
2	17 58.0	16 43 0.90	20 26 24.4	0.9	7.9	0.60	17	14 55.8	16 41 37.90	20 18 22.5	0.9	8.4	0.64
3	17 54.2	16 43 8.44	20 26 30.6	0.9	7.9	0.60	18	14 51.7	16 41 26.88	20 17 56.7	1.0	8.4	0.64
4	17 50.4	16 43 15.56	20 26 36.1	0.9	7.9	0.60	19	14 47.6	16 41 15.53	20 17 30.4	1.0	8.4	0.64
5	17 46.6	16 43 22.27	20 26 40.7	0.9	7.9	0.60	20	14 43.4	16 41 3.85	20 17 3.5	1.0	8.5	0.64
6	17 42.7	16 43 28.56	20 26 44.5	0.9	7.9	0.60	21	14 39.3	16 40 51.85	-20 16 36.1	1.0	8.5	0.64
7	17 38.9	16 43 34.45	20 26 47.5	0.9	7.9	0.60	22	14 35.2	16 40 39.52	20 16 8.2	1.0	8.5	0.64
8	17 35.1	16 43 39.92	20 26 49.7	0.9	7.9	0.60	23	14 31.0	16 40 26.88	20 15 39.8	1.0	8.5	0.64
9	17 31.2	16 43 44.97	20 26 51.2	0.9	7.9	0.61	24	14 26.9	16 40 13.93	20 15 10.8	1.0	8.5	0.64
10	17 27.4	16 43 49.60	20 26 51.8	0.9	8.0	0.61	25	14 22.7	16 40 0.68	20 14 41.4	1.0	8.5	0.65
11	17 23.5	16 43 53.80	20 26 51.7	0.9	8.0	0.61	26	14 18.6	16 39 47.14	-20 14 11.6	1.0	8.5	0.65
12	17 19.7	16 43 57.58	20 26 50.7	0.9	8.0	0.61	27	14 14.4	16 39 33.32	20 13 41.3	1.0	8.5	0.65
13	17 15.8	16 44 0.95	20 26 48.9	0.9	8.0	0.61	28	14 10.3	16 39 19.23	20 13 10.6	1.0	8.6	0.65
14	17 11.9	16 44 3.89	20 26 46.5	0.9	8.0	0.61	29	14 6.1	16 39 4.85	20 12 39.5	1.0	8.6	0.65
15	17 8.0	16 44 6.40	20 26 43.3	0.9	8.0	0.61	30	14 1.9	16 38 50.21	20 12 8.0	1.0	8.6	0.65
16	17 4.1	16 44 8.49	20 26 39.3	0.9	8.0	0.61	May 1	13 57.7	16 38 35.33	-20 11 36.1	1.0	8.6	0.65
17	17 0.2	16 44 10.16	20 26 34.5	0.9	8.0	0.61	2	13 53.6	16 38 20.19	20 11 3.7	1.0	8.6	0.65
18	16 56.3	16 44 11.40	20 26 29.0	0.9	8.0	0.61	3	13 49.4	16 38 4.82	20 10 31.0	1.0	8.6	0.65
19	16 52.4	16 44 12.21	20 26 22.7	0.9	8.1	0.62	4	13 45.2	16 37 49.21	20 9 57.9	1.0	8.6	0.65
20	16 48.5	16 44 12.60	20 26 15.8	0.9	8.1	0.62	5	13 41.0	16 37 33.38	20 9 24.5	1.0	8.6	0.65
21	16 44.5	16 44 12.56	20 26 8.1	0.9	8.1	0.62	6	13 36.8	16 37 17.33	-20 8 50.7	1.0	8.6	0.65
22	16 40.6	16 44 12.10	20 25 59.6	0.9	8.1	0.62	7	13 32.6	16 37 1.07	20 8 16.7	1.0	8.6	0.65
23	16 36.6	16 44 11.21	20 25 50.4	0.9	8.1	0.62	8	13 28.4	16 36 44.60	20 7 42.4	1.0	8.6	0.65
24	16 32.6	16 44 9.89	20 25 40.5	0.9	8.1	0.62	9	13 24.2	16 36 27.94	20 7 7.8	1.0	8.6	0.65
25	16 28.7	16 44 8.16	20 25 29.9	0.9	8.1	0.62	10	13 20.0	16 36 11.10	20 6 32.9	1.0	8.6	0.65
26	16 24.8	16 44 6.01	20 25 18.6	0.9	8.2	0.62	11	13 15.7	16 35 54.07	-20 5 57.7	1.0	8.6	0.65
27	16 20.8	16 44 3.44	20 25 6.6	0.9	8.2	0.62	12	13 11.5	16 35 36.87	20 5 22.2	1.0	8.6	0.65
28	16 16.8	16 44 0.45	20 24 53.8	0.9	8.2	0.62	13	13 7.3	16 35 19.51	20 4 46.6	1.0	8.7	0.65
29	16 12.8	16 43 57.05	20 24 40.3	0.9	8.2	0.62	14	13 3.1	16 35 2.00	20 4 10.7	1.0	8.7	0.66
30	16 8.8	16 43 53.24	20 24 26.1	0.9	8.2	0.62	15	12 58.9	16 34 44.33	20 3 34.6	1.0	8.7	0.66
31	16 4.8	16 43 49.03	20 24 11.3	0.9	8.2	0.62	16	12 54.6	16 34 26.52	-20 2 58.3	1.0	8.7	0.66
Apr 1	16 0.8	16 43 44.41	20 23 56.0	0.9	8.2	0.63	17	12 50.4	16 34 8.60	20 2 21.9	1.0	8.7	0.66
2	15 56.8	16 43 39.39	20 23 39.9	0.9	8.2	0.63	18	12 46.2	16 33 50.57	20 1 45.4	1.0	8.7	0.66
3	15 52.8	16 43 33.97	20 23 23.1	0.9	8.3	0.63	19	12 41.9	16 33 32.42	20 1 8.7	1.0	8.7	0.66
4	15 48.8	16 43 28.15	20 23 5.6	0.9	8.3	0.63	20	12 37.7	16 33 14.18	20 0 31.9	1.0	8.7	0.66
5	15 44.7	16 43 21.94	20 22 47.5	0.9	8.3	0.63	21	12 33.5	16 32 55.86	-19 59 55.0	1.0	8.7	0.66
6	15 40.7	16 43 15.34	20 22 28.8	0.9	8.3	0.63	22	12 29.2	16 32 37.45	19 59 18.2	1.0	8.7	0.66
7	15 36.6	16 43 8.35	20 22 9.5	0.9	8.3	0.63	23	12 25.0	16 32 18.97	19 58 41.4	1.0	8.7	0.66
8	15 32.6	16 43 0.97	20 21 49.6	0.9	8.3	0.63	24	12 20.7	16 32 0.43	19 58 4.5	1.0	8.7	0.66
9	15 28.5	16 42 53.21	20 21 28.9	0.9	8.3	0.63	25	12 16.5	16 31 41.85	19 57 27.5	1.0	8.7	0.66
10	15 24.4	16 42 45.08	20 21 7.8	0.9	8.3	0.63	26	12 12.3	16 31 23.24	-19 56 50.5	1.0	8.7	0.66
11	15 20.4	16 42 36.58	20 20 46.0	0.9	8.3	0.63	27	12 8.0	16 31 4.60	19 56 13.6	1.0	8.7	0.66
12	15 16.3	16 42 27.70	20 20 23.5	0.9	8.4	0.64	28	12 3.8	16 30 45.94	19 55 36.8	1.0	8.7	0.66
13	15 12.2	16 42 18.45	20 20 0.5	0.9	8.4	0.64	29	11 59.5	16 30 27.27	19 55 0.0	1.0	8.7	0.66
14	15 8.1	16 42 8.84	20 19 36.9	0.9	8.4	0.64	30	11 55.3	16 30 8.59	19 54 23.3	1.0	8.7	0.66
15	15 4.0	16 41 58.87	20 19 12.7	0.9	8.4	0.64	31	11 51.0	16 29 49.92	-19 53 46.6	1.0	8.7	0.66
16	14 59.9	16 41 48.56	20 18 47.9	0.9	8.4	0.64	June 1	11 46.8	16 29 31.26	19 53 10.1	1.0	8.7	0.66

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
June 1	11 46.8	16 29 31.26	19 53 10.1	1.0	8.7	0.66	July 16	8 38.5	16 18 8.55	19 33 26.3	0.9	8.4	0.63
2	11 42.5	16 29 12.63	19 52 33.7	1.0	8.7	0.66	17	8 34.4	16 17 59.48	19 33 16.6	0.9	8.4	0.63
3	11 38.3	16 28 54.05	19 51 57.6	1.0	8.7	0.66	18	8 30.3	16 17 50.76	19 33 7.8	0.9	8.4	0.63
4	11 34.0	16 28 35.51	19 51 21.7	1.0	8.7	0.66	19	8 26.3	16 17 42.41	19 32 59.9	0.9	8.4	0.63
5	11 29.8	16 28 17.02	19 50 45.9	1.0	8.7	0.66	20	8 22.2	16 17 34.43	19 32 53.0	0.9	8.4	0.63
6	11 25.6	16 27 58.60	19 50 10.3	1.0	8.7	0.66	21	8 18.2	16 17 26.82	19 32 47.2	0.9	8.4	0.63
7	11 21.3	16 27 40.24	19 49 35.0	1.0	8.7	0.66	22	8 14.1	16 17 19.58	19 32 42.4	0.9	8.4	0.63
8	11 17.1	16 27 21.95	19 49 0.0	1.0	8.7	0.66	23	8 10.1	16 17 12.73	19 32 38.5	0.9	8.3	0.63
9	11 12.9	16 27 3.75	19 48 25.3	1.0	8.7	0.66	24	8 6.0	16 17 6.25	19 32 35.5	0.9	8.3	0.63
10	11 8.6	16 26 45.66	19 47 50.9	1.0	8.7	0.66	25	8 2.0	16 17 0.15	19 32 33.6	0.9	8.3	0.63
11	11 4.4	16 26 27.68	19 47 16.8	1.0	8.7	0.66	26	7 58.0	16 16 54.42	19 32 32.8	0.9	8.3	0.63
12	11 0.2	16 26 9.81	19 46 43.0	1.0	8.7	0.66	27	7 53.9	16 16 49.08	19 32 32.9	0.9	8.3	0.63
13	10 56.0	16 25 52.07	19 46 9.7	1.0	8.7	0.65	28	7 49.9	16 16 44.12	19 32 34.0	0.9	8.3	0.63
14	10 51.7	16 25 34.47	19 45 36.8	1.0	8.6	0.65	29	7 45.9	16 16 39.55	19 32 36.1	0.9	8.3	0.63
15	10 47.5	16 25 17.01	19 45 4.4	1.0	8.6	0.65	30	7 41.9	16 16 35.38	19 32 39.2	0.9	8.3	0.63
16	10 43.3	16 24 59.68	19 44 32.3	1.0	8.6	0.65	31	7 37.9	16 16 31.61	19 32 43.3	0.9	8.2	0.62
17	10 39.1	16 24 42.52	19 44 0.7	1.0	8.6	0.65	Aug. 1	7 33.9	16 16 28.21	19 32 48.4	0.9	8.2	0.62
18	10 34.9	16 24 25.54	19 43 29.5	1.0	8.6	0.65	2	7 30.0	16 16 25.20	19 32 54.6	0.9	8.2	0.62
19	10 30.7	16 24 8.73	19 42 58.9	1.0	8.6	0.65	3	7 26.0	16 16 22.59	19 33 1.8	0.9	8.2	0.62
20	10 26.5	16 23 52.10	19 42 28.8	1.0	8.6	0.65	4	7 22.0	16 16 20.38	19 33 10.0	0.9	8.2	0.62
21	10 22.3	16 23 35.67	19 41 59.3	1.0	8.6	0.65	5	7 18.0	16 16 18.56	19 33 19.3	0.9	8.2	0.62
22	10 18.1	16 23 19.45	19 41 30.2	1.0	8.6	0.65	6	7 14.1	16 16 17.14	19 33 29.6	0.9	8.2	0.62
23	10 13.9	16 23 3.44	19 41 1.8	1.0	8.6	0.65	7	7 10.1	16 16 16.13	19 33 40.9	0.9	8.1	0.62
24	10 9.7	16 22 47.64	19 40 33.9	1.0	8.6	0.65	8	7 6.2	16 16 15.51	19 33 53.2	0.9	8.1	0.61
25	10 5.5	16 22 32.07	19 40 6.7	1.0	8.6	0.65	9	7 2.3	16 16 15.29	19 34 6.5	0.9	8.1	0.61
26	10 1.3	16 22 16.73	19 39 40.2	1.0	8.6	0.65	10	6 58.3	16 16 15.48	19 34 20.9	0.9	8.1	0.61
27	9 57.1	16 22 1.63	19 39 14.3	1.0	8.6	0.65	11	6 54.4	16 16 16.07	19 34 36.3	0.9	8.1	0.61
28	9 52.9	16 21 46.78	19 38 49.0	1.0	8.6	0.65	12	6 50.5	16 16 17.07	19 34 52.7	0.9	8.0	0.61
29	9 48.7	16 21 32.18	19 38 24.5	1.0	8.5	0.64	13	6 46.6	16 16 18.48	19 35 10.2	0.9	8.0	0.61
30	9 44.6	16 21 17.85	19 38 0.7	1.0	8.5	0.64	14	6 42.7	16 16 20.29	19 35 28.6	0.9	8.0	0.61
July 1	9 40.4	16 21 3.78	19 37 37.5	1.0	8.5	0.64	15	6 38.8	16 16 22.50	19 35 48.0	0.9	8.0	0.61
2	9 36.3	16 20 49.98	19 37 15.0	1.0	8.5	0.64	16	6 34.9	16 16 25.11	19 36 8.4	0.9	8.0	0.60
3	9 32.1	16 20 36.46	19 36 53.3	1.0	8.5	0.64	17	6 31.0	16 16 28.13	19 36 29.8	0.9	7.9	0.60
4	9 27.9	16 20 23.23	19 36 32.4	1.0	8.5	0.64	18	6 27.1	16 16 31.56	19 36 52.2	0.9	7.9	0.60
5	9 23.8	16 20 10.29	19 36 12.3	1.0	8.5	0.64	19	6 23.3	16 16 35.39	19 37 15.6	0.9	7.9	0.60
6	9 19.6	16 19 57.63	19 35 53.0	1.0	8.5	0.64	20	6 19.4	16 16 39.63	19 37 39.9	0.9	7.9	0.60
7	9 15.5	16 19 45.27	19 35 34.4	1.0	8.4	0.64	21	6 15.5	16 16 44.27	19 38 5.2	0.9	7.9	0.60
8	9 11.4	16 19 33.23	19 35 16.7	1.0	8.4	0.64	22	6 11.7	16 16 49.31	19 38 31.6	0.9	7.9	0.60
9	9 7.3	16 19 21.50	19 34 59.8	1.0	8.4	0.64	23	6 7.9	16 16 54.75	19 38 58.9	0.9	7.8	0.59
10	9 3.1	16 19 10.09	19 34 43.8	1.0	8.4	0.64	24	6 4.0	16 17 0.59	19 39 27.1	0.9	7.8	0.59
11	8 59.0	16 18 58.99	19 34 28.6	1.0	8.4	0.64	25	6 0.2	16 17 6.83	19 39 56.3	0.9	7.8	0.59
12	8 54.9	16 18 48.22	19 34 14.3	1.0	8.4	0.64	26	5 56.4	16 17 13.46	19 40 26.4	0.9	7.8	0.59
13	8 50.8	16 18 37.79	19 34 1.0	1.0	8.4	0.64	27	5 52.6	16 17 20.49	19 40 57.4	0.9	7.8	0.59
14	8 46.7	16 18 27.70	19 33 48.5	1.0	8.4	0.64	28	5 48.8	16 17 27.91	19 41 29.4	0.9	7.8	0.59
15	8 42.6	16 18 17.95	19 33 36.9	1.0	8.4	0.64	29	5 45.0	16 17 35.71	19 42 2.2	0.9	7.8	0.59
16	8 38.5	16 18 8.55	19 33 26.3	0.9	8.4	0.63	30	5 41.2	16 17 43.91	19 42 35.8	0.9	7.7	0.59
17	8 34.4	16 17 59.48	19 33 16.6	0.9	8.4	0.63	31	5 37.4	16 17 52.50	19 43 10.3	0.9	7.7	0.59

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
June 1	11 13.4	15 56 3.63	-20 13 48.2	0.5	1.9	0.13	July 16	8 10.6	15 50 10.11	-19 56 42.8	0.5	1.8	0.13
2	11 9.3	15 55 53.50	-20 13 19.0	0.5	1.9	0.13	17	8 6.6	15 50 5.72	-19 56 30.3	0.5	1.8	0.13
3	11 5.2	15 55 43.42	-20 12 50.0	0.5	1.9	0.13	18	8 2.6	15 50 1.52	-19 56 18.4	0.5	1.8	0.13
4	11 1.1	15 55 33.40	-20 12 21.0	0.5	1.9	0.13	19	7 58.6	15 49 57.51	-19 56 7.1	0.5	1.8	0.13
5	10 57.0	15 55 23.43	-20 11 52.2	0.5	1.9	0.13	20	7 54.6	15 49 53.70	-19 55 56.4	0.5	1.8	0.13
6	10 52.9	15 55 13.53	-20 11 23.6	0.5	1.9	0.13	21	7 50.6	15 49 50.09	-19 55 46.3	0.5	1.8	0.13
7	10 48.8	15 55 3.69	-20 10 55.2	0.5	1.9	0.13	22	7 46.6	15 49 46.68	-19 55 36.8	0.5	1.8	0.13
8	10 44.7	15 54 53.92	-20 10 26.9	0.5	1.9	0.13	23	7 42.6	15 49 43.47	-19 55 27.9	0.5	1.8	0.13
9	10 40.6	15 54 44.22	-20 9 58.8	0.5	1.9	0.13	24	7 38.7	15 49 40.45	-19 55 19.7	0.5	1.8	0.13
10	10 36.5	15 54 34.60	-20 9 30.9	0.5	1.9	0.13	25	7 34.7	15 49 37.63	-19 55 12.1	0.5	1.8	0.13
11	10 32.4	15 54 25.07	-20 9 3.3	0.5	1.9	0.13	26	7 30.7	15 49 35.02	-19 55 5.1	0.5	1.8	0.13
12	10 28.4	15 54 15.62	-20 8 36.0	0.5	1.9	0.13	27	7 26.7	15 49 32.62	-19 54 58.7	0.5	1.8	0.13
13	10 24.3	15 54 6.25	-20 8 8.8	0.5	1.9	0.13	28	7 22.8	15 49 30.42	-19 54 53.0	0.5	1.8	0.13
14	10 20.2	15 53 56.98	-20 7 41.9	0.5	1.9	0.13	29	7 18.8	15 49 28.43	-19 54 47.9	0.5	1.8	0.13
15	10 16.1	15 53 47.81	-20 7 15.2	0.5	1.9	0.13	30	7 14.8	15 49 26.64	-19 54 43.4	0.5	1.8	0.13
16	10 12.0	15 53 38.74	-20 6 48.8	0.5	1.9	0.13	31	7 10.9	15 49 25.06	-19 54 39.6	0.5	1.8	0.13
17	10 7.9	15 53 29.77	-20 6 22.8	0.5	1.9	0.13	Aug. 1	7 6.9	15 49 23.68	-19 54 36.4	0.5	1.8	0.13
18	10 3.9	15 53 20.92	-20 5 57.1	0.5	1.9	0.13	2	7 2.9	15 49 22.51	-19 54 33.9	0.5	1.8	0.13
19	9 59.8	15 53 12.19	-20 5 31.6	0.5	1.9	0.13	3	6 59.0	15 49 21.55	-19 54 32.0	0.5	1.8	0.13
20	9 55.7	15 53 3.56	-20 5 6.5	0.5	1.9	0.13	4	6 55.1	15 49 20.80	-19 54 30.8	0.5	1.8	0.13
21	9 51.6	15 52 55.05	-20 4 41.6	0.5	1.9	0.13	5	6 51.1	15 49 20.27	-19 54 30.2	0.5	1.8	0.13
22	9 47.6	15 52 46.66	-20 4 17.1	0.5	1.9	0.13	6	6 47.2	15 49 19.94	-19 54 30.2	0.5	1.8	0.13
23	9 43.5	15 52 38.40	-20 3 53.0	0.5	1.9	0.13	7	6 43.3	15 49 19.82	-19 54 30.9	0.5	1.8	0.13
24	9 39.4	15 52 30.27	-20 3 29.4	0.5	1.9	0.13	8	6 39.3	15 49 19.91	-19 54 32.3	0.5	1.8	0.13
25	9 35.4	15 52 22.28	-20 3 6.2	0.5	1.9	0.13	9	6 35.4	15 49 20.22	-19 54 34.3	0.5	1.8	0.13
26	9 31.3	15 52 14.43	-20 2 43.3	0.5	1.9	0.13	10	6 31.5	15 49 20.74	-19 54 37.0	0.5	1.8	0.13
27	9 27.2	15 52 6.72	-20 2 20.8	0.5	1.9	0.13	11	6 27.6	15 49 21.48	-19 54 40.4	0.5	1.8	0.13
28	9 23.2	15 51 59.14	-20 1 58.8	0.5	1.9	0.13	12	6 23.6	15 49 22.43	-19 54 44.5	0.5	1.8	0.13
29	9 19.1	15 51 51.71	-20 1 37.1	0.5	1.9	0.13	13	6 19.7	15 49 23.59	-19 54 49.2	0.5	1.8	0.13
30	9 15.1	15 51 44.43	-20 1 15.9	0.5	1.9	0.13	14	6 15.8	15 49 24.96	-19 54 54.5	0.5	1.8	0.13
July 1	9 11.0	15 51 37.30	-20 0 55.1	0.5	1.9	0.13	15	6 11.9	15 49 26.55	-19 55 0.5	0.5	1.8	0.13
2	9 7.0	15 51 30.32	-20 0 34.8	0.5	1.9	0.13	16	6 8.0	15 49 28.36	-19 55 7.3	0.5	1.8	0.13
3	9 2.9	15 51 23.50	-20 0 14.9	0.5	1.9	0.13	17	6 4.1	15 49 30.38	-19 55 14.6	0.5	1.8	0.13
4	8 58.9	15 51 16.83	-19 59 55.5	0.5	1.8	0.13	18	6 0.2	15 49 32.62	-19 55 22.6	0.5	1.8	0.13
5	8 54.8	15 51 10.33	-19 59 36.5	0.5	1.8	0.13	19	5 56.3	15 49 35.07	-19 55 31.3	0.5	1.8	0.13
6	8 50.8	15 51 3.99	-19 59 18.1	0.5	1.8	0.13	20	5 52.4	15 49 37.74	-19 55 40.6	0.5	1.8	0.13
7	8 46.8	15 50 57.83	-19 59 0.2	0.5	1.8	0.13	21	5 48.5	15 49 40.63	-19 55 50.6	0.5	1.8	0.13
8	8 42.7	15 50 51.83	-19 58 42.8	0.5	1.8	0.13	22	5 44.7	15 49 43.73	-19 56 1.2	0.5	1.8	0.13
9	8 38.7	15 50 45.99	-19 58 25.9	0.5	1.8	0.13	23	5 40.8	15 49 47.03	-19 56 12.5	0.5	1.8	0.13
10	8 34.7	15 50 40.32	-19 58 9.5	0.5	1.8	0.13	24	5 36.9	15 49 50.54	-19 56 24.5	0.5	1.8	0.13
11	8 30.7	15 50 34.83	-19 57 53.7	0.5	1.8	0.13	25	5 33.1	15 49 54.27	-19 56 37.1	0.5	1.8	0.13
12	8 26.6	15 50 29.52	-19 57 38.4	0.5	1.8	0.13	26	5 29.2	15 49 58.21	-19 56 50.3	0.5	1.8	0.13
13	8 22.6	15 50 24.39	-19 57 23.6	0.5	1.8	0.13	27	5 25.3	15 50 2.36	-19 57 4.1	0.5	1.8	0.13
14	8 18.6	15 50 19.45	-19 57 9.4	0.5	1.8	0.13	28	5 21.5	15 50 6.72	-19 57 18.6	0.5	1.8	0.13
15	8 14.6	15 50 14.69	-19 56 55.8	0.5	1.8	0.13	29	5 17.6	15 50 11.29	-19 57 33.7	0.5	1.8	0.13
16	8 10.6	15 50 10.11	-19 56 42.8	0.5	1.8	0.13	30	5 13.7	15 50 16.06	-19 57 49.4	0.5	1.8	0.13
17	8 6.6	15 50 5.72	-19 56 30.3	0.5	1.8	0.13	31	5 9.9	15 50 21.04	-19 58 5.8	0.5	1.8	0.13

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	"		h m	h m s	° ' "	"	"	"
Mar. 1	17 25.2	16 6 11.92	20 42 3.1	0.5	1.8	0.13	Apr. 16	14 21.7	16 3 29.73	20 34 42.7	0.5	1.9	0.13
2	17 21.3	16 6 13.15	20 42 6.4	0.5	1.8	0.13	17	14 17.6	16 3 21.90	20 34 21.2	0.5	1.9	0.13
3	17 17.4	16 6 14.15	20 42 9.2	0.5	1.8	0.13	18	14 13.5	16 3 13.92	20 33 59.3	0.5	1.9	0.13
4	17 13.5	16 6 14.92	20 42 11.3	0.5	1.8	0.13	19	14 9.5	16 3 5.81	20 33 37.1	0.5	1.9	0.13
5	17 9.6	16 6 15.47	20 42 12.9	0.5	1.8	0.13	20	14 5.4	16 2 57.57	20 33 14.4	0.5	1.9	0.13
6	17 5.6	16 6 15.80	20 42 13.8	0.5	1.8	0.13	21	14 1.3	16 2 49.19	20 32 51.3	0.5	1.9	0.13
7	17 1.7	16 6 15.91	20 42 14.1	0.5	1.8	0.13	22	13 57.3	16 2 40.68	20 32 27.8	0.5	1.9	0.13
8	16 57.8	16 6 15.80	20 42 13.8	0.5	1.8	0.13	23	13 53.2	16 2 32.05	20 32 4.0	0.5	1.9	0.13
9	16 53.8	16 6 15.46	20 42 12.9	0.5	1.8	0.13	24	13 49.1	16 2 23.31	20 31 39.9	0.5	1.9	0.13
10	16 49.9	16 6 14.90	20 42 11.3	0.5	1.8	0.13	25	13 45.0	16 2 14.45	20 31 15.3	0.5	1.9	0.13
11	16 46.0	16 6 14.11	20 42 9.2	0.5	1.8	0.13	26	13 41.0	16 2 5.48	20 30 50.5	0.5	1.9	0.13
12	16 42.0	16 6 13.10	20 42 6.5	0.5	1.8	0.13	27	13 36.9	16 1 56.41	20 30 25.4	0.5	1.9	0.13
13	16 38.1	16 6 11.87	20 42 3.2	0.5	1.8	0.13	28	13 32.8	16 1 47.24	20 29 59.9	0.5	1.9	0.13
14	16 34.1	16 6 10.42	20 41 59.3	0.5	1.8	0.13	29	13 28.7	16 1 37.97	20 29 34.1	0.5	1.9	0.13
15	16 30.1	16 6 8.76	20 41 54.8	0.5	1.8	0.13	30	13 24.6	16 1 28.60	20 29 8.0	0.5	1.9	0.13
16	16 26.2	16 6 6.87	20 41 49.8	0.5	1.8	0.13	May 1	13 20.5	16 1 19.14	20 28 41.7	0.5	1.9	0.13
17	16 22.2	16 6 4.77	20 41 44.2	0.5	1.8	0.13	2	13 16.4	16 1 9.59	20 28 15.2	0.5	1.9	0.13
18	16 18.2	16 6 2.45	20 41 37.9	0.5	1.8	0.13	3	13 12.3	16 0 59.95	20 27 48.3	0.5	1.9	0.13
19	16 14.3	16 5 59.92	20 41 31.0	0.5	1.8	0.13	4	13 8.2	16 0 50.24	20 27 21.1	0.5	1.9	0.13
20	16 10.3	16 5 57.17	20 41 23.6	0.5	1.8	0.13	5	13 4.2	16 0 40.45	20 26 53.7	0.5	1.9	0.13
21	16 6.3	16 5 54.21	20 41 15.7	0.5	1.8	0.13	6	13 0.1	16 0 30.59	20 26 26.2	0.5	1.9	0.13
22	16 2.3	16 5 51.04	20 41 7.2	0.5	1.8	0.13	7	12 56.0	16 0 20.67	20 25 58.5	0.5	1.9	0.13
23	15 58.3	16 5 47.65	20 40 58.1	0.5	1.8	0.13	8	12 51.9	16 0 10.69	20 25 30.5	0.5	1.9	0.13
24	15 54.3	16 5 44.06	20 40 48.3	0.5	1.8	0.13	9	12 47.8	16 0 0.66	20 25 2.4	0.5	1.9	0.13
25	15 50.3	16 5 40.25	20 40 38.1	0.5	1.8	0.13	10	12 43.7	15 59 50.57	20 24 34.0	0.5	1.9	0.13
26	15 46.3	16 5 36.26	20 40 27.3	0.5	1.8	0.13	11	12 39.6	15 59 40.43	20 24 5.4	0.5	1.9	0.13
27	15 42.3	16 5 32.07	20 40 16.0	0.5	1.8	0.13	12	12 35.5	15 59 30.24	20 23 36.6	0.5	1.9	0.13
28	15 38.3	16 5 27.68	20 40 4.1	0.5	1.8	0.13	13	12 31.4	15 59 20.01	20 23 7.8	0.5	1.9	0.13
29	15 34.3	16 5 23.10	20 39 51.6	0.5	1.8	0.13	14	12 27.3	15 59 9.74	20 22 38.8	0.5	1.9	0.13
30	15 30.3	16 5 18.32	20 39 38.6	0.5	1.8	0.13	15	12 23.2	15 58 59.44	20 22 9.7	0.5	1.9	0.13
31	15 26.3	16 5 13.34	20 39 25.1	0.5	1.8	0.13	16	12 19.1	15 58 49.10	20 21 40.4	0.5	1.9	0.13
Apr. 1	15 22.3	16 5 8.16	20 39 11.1	0.5	1.8	0.13	17	12 15.0	15 58 38.74	20 21 11.1	0.5	1.9	0.13
2	15 18.3	16 5 2.80	20 38 56.5	0.5	1.8	0.13	18	12 10.8	15 58 28.36	20 20 41.7	0.5	1.9	0.13
3	15 14.2	16 4 57.26	20 38 41.5	0.5	1.8	0.13	19	12 6.7	15 58 17.97	20 20 12.2	0.5	1.9	0.13
4	15 10.2	16 4 51.54	20 38 26.0	0.5	1.8	0.13	20	12 2.6	15 58 7.57	20 19 42.6	0.5	1.9	0.13
5	15 6.2	16 4 45.65	20 38 10.0	0.5	1.8	0.13	21	11 58.5	15 57 57.17	20 19 13.0	0.5	1.9	0.13
6	15 2.1	16 4 39.59	20 37 53.5	0.5	1.8	0.13	22	11 54.4	15 57 46.76	20 18 43.4	0.5	1.9	0.13
7	14 58.1	16 4 33.35	20 37 36.5	0.5	1.8	0.13	23	11 50.3	15 57 36.36	20 18 13.8	0.5	1.9	0.13
8	14 54.1	16 4 26.93	20 37 19.0	0.5	1.8	0.13	24	11 46.2	15 57 25.96	20 17 44.2	0.5	1.9	0.13
9	14 50.0	16 4 20.34	20 37 1.1	0.5	1.8	0.13	25	11 42.1	15 57 15.58	20 17 14.5	0.5	1.9	0.13
10	14 46.0	16 4 13.59	20 36 42.7	0.5	1.8	0.13	26	11 38.0	15 57 5.21	20 16 44.9	0.5	1.9	0.13
11	14 41.9	16 4 6.67	20 36 23.8	0.5	1.9	0.13	27	11 33.9	15 56 54.86	20 16 15.3	0.5	1.9	0.13
12	14 37.9	16 3 59.59	20 36 4.4	0.5	1.9	0.13	28	11 29.8	15 56 44.54	20 15 45.7	0.5	1.9	0.13
13	14 33.8	16 3 52.35	20 35 44.7	0.5	1.9	0.13	29	11 25.7	15 56 34.26	20 15 16.2	0.5	1.9	0.13
14	14 29.8	16 3 44.96	20 35 24.5	0.5	1.9	0.13	30	11 21.6	15 56 24.01	20 14 46.8	0.5	1.9	0.13
15	14 25.7	16 3 37.42	20 35 3.8	0.5	1.9	0.13	31	11 17.5	15 56 13.80	20 14 17.5	0.5	1.9	0.13
16	14 21.7	16 3 29.73	20 34 42.7	0.5	1.9	0.13	June 1	11 13.4	15 56 3.63	20 13 48.2	0.5	1.9	0.13

## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi-diam.	S.T. of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Jan. 0	10 36.2	5 19 31.98	+21 43 45.9	0.3	1.3	0.10	Feb. 14	7 35.8	5 16 0.72	+21 41 59.4	0.3	1.3	0.09
1	10 32.2	5 19 25.26	21 43 40.8	0.3	1.3	0.10	15	7 31.9	5 15 58.79	21 42 0.5	0.3	1.3	0.09
2	10 28.2	5 19 18.60	21 43 35.8	0.3	1.3	0.10	16	7 27.9	5 15 57.00	21 42 1.7	0.3	1.3	0.09
3	10 24.1	5 19 11.99	21 43 30.9	0.3	1.3	0.10	17	7 23.9	5 15 55.36	21 42 3.1	0.3	1.3	0.09
4	10 20.1	5 19 5.45	21 43 26.2	0.3	1.3	0.10	18	7 20.0	5 15 53.86	21 42 4.6	0.3	1.3	0.09
5	10 16.1	5 18 58.98	+21 43 21.5	0.3	1.3	0.10	19	7 16.0	5 15 52.49	+21 42 6.3	0.3	1.3	0.09
6	10 12.0	5 18 52.57	21 43 16.9	0.3	1.3	0.10	20	7 12.1	5 15 51.26	21 42 8.2	0.3	1.3	0.09
7	10 8.0	5 18 46.23	21 43 12.3	0.3	1.3	0.10	21	7 8.1	5 15 50.19	21 42 10.3	0.3	1.3	0.09
8	10 3.9	5 18 39.97	21 43 7.9	0.3	1.3	0.10	22	7 4.2	5 15 49.26	21 42 12.5	0.3	1.3	0.09
9	9 59.9	5 18 33.79	21 43 3.6	0.3	1.3	0.10	23	7 0.2	5 15 48.48	21 42 14.9	0.3	1.3	0.09
10	9 55.9	5 18 27.69	+21 42 59.4	0.3	1.3	0.10	24	6 56.3	5 15 47.84	+21 42 17.4	0.3	1.3	0.09
11	9 51.8	5 18 21.66	21 42 55.4	0.3	1.3	0.10	25	6 52.4	5 15 47.35	21 42 20.0	0.3	1.3	0.09
12	9 47.8	5 18 15.72	21 42 51.5	0.3	1.3	0.10	26	6 48.4	5 15 47.01	21 42 22.8	0.3	1.3	0.09
13	9 43.8	5 18 9.88	21 42 47.7	0.3	1.3	0.10	27	6 44.5	5 15 46.82	21 42 25.8	0.3	1.3	0.09
14	9 39.7	5 18 4.13	21 42 43.9	0.3	1.3	0.10	28	6 40.5	5 15 46.76	21 42 29.0	0.3	1.3	0.09
15	9 35.7	5 17 58.47	+21 42 40.4	0.3	1.3	0.10	Mar. 1	6 36.6	5 15 46.85	+21 42 32.4	0.3	1.3	0.09
16	9 31.7	5 17 52.90	21 42 37.0	0.3	1.3	0.10	2	6 32.7	5 15 47.10	21 42 35.9	0.3	1.3	0.09
17	9 27.7	5 17 47.43	21 42 33.7	0.3	1.3	0.10	3	6 28.8	5 15 47.50	21 42 39.6	0.3	1.3	0.09
18	9 23.6	5 17 42.06	21 42 30.5	0.3	1.3	0.10	4	6 24.8	5 15 48.04	21 42 43.4	0.3	1.3	0.09
19	9 19.6	5 17 36.79	21 42 27.4	0.3	1.3	0.10	5	6 20.9	5 15 48.72	21 42 47.4	0.3	1.3	0.09
20	9 15.6	5 17 31.61	+21 42 24.5	0.3	1.3	0.10	6	6 17.0	5 15 49.55	+21 42 51.5	0.3	1.3	0.09
21	9 11.6	5 17 26.54	21 42 21.7	0.3	1.3	0.09	7	6 13.1	5 15 50.53	21 42 55.7	0.3	1.3	0.09
22	9 7.6	5 17 21.58	21 42 19.1	0.3	1.3	0.09	8	6 9.2	5 15 51.65	21 43 0.1	0.3	1.3	0.09
23	9 3.6	5 17 16.72	21 42 16.6	0.3	1.3	0.09	9	6 5.3	5 15 52.93	21 43 4.7	0.3	1.3	0.09
24	8 59.6	5 17 11.97	21 42 14.2	0.3	1.3	0.09	10	6 1.4	5 15 54.35	+21 43 9.5	0.3	1.3	0.09
25	8 55.6	5 17 7.34	+21 42 11.9	0.3	1.3	0.09	Sept. 10	18 15.2	5 37 12.25	+22 1 58.0	0.3	1.3	0.09
26	8 51.6	5 17 2.82	21 42 9.8	0.3	1.3	0.09	11	18 11.3	5 37 14.53	22 1 57.0	0.3	1.3	0.09
27	8 47.6	5 16 58.42	21 42 7.9	0.3	1.3	0.09	12	18 7.4	5 37 16.66	22 1 55.9	0.3	1.3	0.09
28	8 43.6	5 16 54.14	21 42 6.2	0.3	1.3	0.09	13	18 3.5	5 37 18.65	22 1 54.8	0.3	1.3	0.09
29	8 39.6	5 16 49.98	21 42 4.6	0.3	1.3	0.09	14	17 59.6	5 37 20.50	22 1 53.6	0.3	1.3	0.09
30	8 35.6	5 16 45.94	+21 42 3.1	0.3	1.3	0.09	15	17 55.6	5 37 22.21	+22 1 52.3	0.3	1.3	0.09
31	8 31.6	5 16 42.02	21 42 1.7	0.3	1.3	0.09	16	17 51.8	5 37 23.78	22 1 50.9	0.3	1.3	0.09
Feb. 1	8 27.6	5 16 38.23	21 42 0.5	0.3	1.3	0.09	17	17 47.9	5 37 25.19	22 1 49.4	0.3	1.3	0.09
2	8 23.6	5 16 34.56	21 41 59.5	0.3	1.3	0.09	18	17 44.0	5 37 26.46	22 1 47.8	0.3	1.3	0.09
3	8 19.6	5 16 31.01	21 41 58.6	0.3	1.3	0.09	19	17 40.1	5 37 27.59	22 1 46.1	0.3	1.3	0.09
4	8 15.6	5 16 27.59	+21 41 57.8	0.3	1.3	0.09	20	17 36.1	5 37 28.58	+22 1 44.4	0.3	1.3	0.09
5	8 11.6	5 16 24.31	21 41 57.2	0.3	1.3	0.09	21	17 32.2	5 37 29.41	22 1 42.6	0.3	1.3	0.09
6	8 7.6	5 16 21.16	21 41 56.8	0.3	1.3	0.09	22	17 28.3	5 37 30.11	22 1 40.7	0.3	1.3	0.09
7	8 3.7	5 16 18.13	21 41 56.6	0.3	1.3	0.09	23	17 24.4	5 37 30.67	22 1 38.7	0.3	1.3	0.09
8	7 59.7	5 16 15.23	21 41 56.5	0.3	1.3	0.09	24	17 20.5	5 37 31.09	22 1 36.7	0.3	1.3	0.09
9	7 55.7	5 16 12.46	+21 41 56.6	0.3	1.3	0.09	25	17 16.5	5 37 31.35	+22 1 34.6	0.3	1.3	0.09
10	7 51.7	5 16 9.84	21 41 56.8	0.3	1.3	0.09	26	17 12.6	5 37 31.47	22 1 32.4	0.3	1.3	0.09
11	7 47.7	5 16 7.35	21 41 57.2	0.3	1.3	0.09	27	17 8.7	5 37 31.45	22 1 30.2	0.3	1.3	0.09
12	7 43.8	5 16 5.00	21 41 57.7	0.3	1.3	0.09	28	17 4.7	5 37 31.29	22 1 27.9	0.3	1.3	0.09
13	7 39.8	5 16 2.79	21 41 58.5	0.3	1.3	0.09	29	17 0.8	5 37 30.98	22 1 25.5	0.3	1.3	0.09
14	7 35.8	5 16 0.72	+21 41 59.4	0.3	1.3	0.09	30	16 56.8	5 37 30.52	+22 1 23.0	0.3	1.3	0.09
15	7 31.9	5 15 58.79	+21 42 0.5	0.3	1.3	0.09	Oct. 1	16 52.9	5 37 29.93	+22 1 20.4	0.3	1.3	0.09



## FOR TRANSIT AT WASHINGTON.

Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.	Date.	Mean Time of Transit.	Apparent R. Ascension at Transit.	Apparent Declination at Transit.	Hor. Par.	Semi- diam.	S.T.of Sem. Pass. Mer.
	h m	h m s	° ' "	"	"	s		h m	h m s	° ' "	"	"	s
Oct. 1	16 52.9	5 37 29.93	+22 1 20.4	0.3	1.3	0.09	Nov. 16	13 49.3	5 34 41.34	+21 58 24.1	0.3	1.3	0.10
2	16 49.0	5 37 29.20	22 1 17.8	0.3	1.3	0.09	17	13 45.2	5 34 35.14	21 58 19.4	0.3	1.3	0.10
3	16 45.0	5 37 28.32	22 1 15.1	0.3	1.3	0.09	18	13 41.2	5 34 28.87	21 58 14.7	0.3	1.3	0.10
4	16 41.1	5 37 27.30	22 1 12.4	0.3	1.3	0.09	19	13 37.1	5 34 22.52	21 58 9.9	0.3	1.3	0.10
5	16 37.1	5 37 26.13	22 1 9.6	0.3	1.3	0.09	20	13 33.1	5 34 16.10	21 58 5.1	0.3	1.3	0.10
6	16 33.2	5 37 24.82	+22 1 6.7	0.3	1.3	0.09	21	13 29.1	5 34 9.61	+21 58 0.3	0.3	1.3	0.10
7	16 29.2	5 37 23.37	22 1 3.8	0.3	1.3	0.09	22	13 25.0	5 34 3.05	21 57 55.5	0.3	1.3	0.10
8	16 25.2	5 37 21.78	22 1 0.8	0.3	1.3	0.09	23	13 21.0	5 33 56.43	21 57 50.7	0.3	1.3	0.10
9	16 21.3	5 37 20.05	22 0 57.7	0.3	1.3	0.09	24	13 16.9	5 33 49.74	21 57 45.9	0.3	1.3	0.10
10	16 17.3	5 37 18.18	22 0 54.5	0.3	1.3	0.09	25	13 12.9	5 33 43.00	21 57 41.1	0.3	1.3	0.10
11	16 13.4	5 37 16.17	+22 0 51.3	0.3	1.3	0.09	26	13 8.9	5 33 36.21	+21 57 36.3	0.3	1.3	0.10
12	16 9.4	5 37 14.02	22 0 48.0	0.3	1.3	0.09	27	13 4.8	5 33 29.36	21 57 31.5	0.3	1.3	0.10
13	16 5.4	5 37 11.73	22 0 44.7	0.3	1.3	0.09	28	13 0.8	5 33 22.46	21 57 26.6	0.3	1.3	0.10
14	16 1.5	5 37 9.30	22 0 41.3	0.3	1.3	0.09	29	12 56.7	5 33 15.52	21 57 21.8	0.3	1.3	0.10
15	15 57.5	5 37 6.74	22 0 37.9	0.3	1.3	0.09	30	12 52.6	5 33 8.53	21 57 17.0	0.3	1.3	0.10
16	15 53.5	5 37 4.05	+22 0 34.4	0.3	1.3	0.09	Dec. 1	12 48.6	5 33 1.50	+21 57 12.2	0.3	1.3	0.10
17	15 49.5	5 37 1.23	22 0 30.8	0.3	1.3	0.09	2	12 44.5	5 32 54.42	21 57 7.4	0.3	1.3	0.10
18	15 45.5	5 36 58.27	22 0 27.2	0.3	1.3	0.09	3	12 40.5	5 32 47.32	21 57 2.6	0.3	1.3	0.10
19	15 41.6	5 36 55.17	22 0 23.6	0.3	1.3	0.09	4	12 36.5	5 32 40.19	21 56 57.8	0.3	1.3	0.10
20	15 37.6	5 36 51.94	22 0 19.9	0.3	1.3	0.09	5	12 32.4	5 32 33.03	21 56 53.0	0.3	1.3	0.10
21	15 33.6	5 36 48.58	+22 0 16.2	0.3	1.3	0.09	6	12 28.4	5 32 25.83	+21 56 48.2	0.3	1.3	0.10
22	15 29.6	5 36 45.10	22 0 12.4	0.3	1.3	0.09	7	12 24.3	5 32 18.61	21 56 43.4	0.3	1.3	0.10
23	15 25.6	5 36 41.49	22 0 8.6	0.3	1.3	0.09	8	12 20.2	5 32 11.37	21 56 38.7	0.3	1.3	0.10
24	15 21.6	5 36 37.76	22 0 4.7	0.3	1.3	0.09	9	12 16.2	5 32 4.11	21 56 34.0	0.3	1.3	0.10
25	15 17.6	5 36 33.91	22 0 0.7	0.3	1.3	0.09	10	12 12.1	5 31 56.83	21 56 29.3	0.3	1.3	0.10
26	15 13.6	5 36 29.95	+21 59 56.7	0.3	1.3	0.09	11	12 8.0	5 31 49.53	+21 56 24.6	0.3	1.3	0.10
27	15 9.6	5 36 25.85	21 59 52.6	0.3	1.3	0.09	12	12 4.0	5 31 42.23	21 56 20.0	0.3	1.3	0.10
28	15 5.6	5 36 21.64	21 59 48.5	0.3	1.3	0.09	13	12 0.0	5 31 34.92	21 56 15.4	0.3	1.3	0.10
29	15 1.6	5 36 17.31	21 59 44.4	0.3	1.3	0.09	14	11 55.9	5 31 27.61	21 56 10.8	0.3	1.3	0.10
30	14 57.6	5 36 12.87	21 59 40.2	0.3	1.3	0.09	15	11 51.9	5 31 20.30	21 56 6.2	0.3	1.3	0.10
31	14 53.6	5 36 8.31	+21 59 36.0	0.3	1.3	0.09	16	11 47.8	5 31 12.99	+21 56 1.7	0.3	1.3	0.10
Nov. 1	14 49.6	5 36 3.64	21 59 31.7	0.3	1.3	0.09	17	11 43.8	5 31 5.68	21 55 57.2	0.3	1.3	0.10
2	14 45.6	5 35 58.87	21 59 27.4	0.3	1.3	0.09	18	11 39.7	5 30 58.39	21 55 52.8	0.3	1.3	0.10
3	14 41.6	5 35 53.98	21 59 23.1	0.3	1.3	0.09	19	11 35.7	5 30 51.11	21 55 48.4	0.3	1.3	0.10
4	14 37.6	5 35 48.97	21 59 18.8	0.3	1.3	0.09	20	11 31.6	5 30 43.83	21 55 44.0	0.3	1.3	0.10
5	14 33.5	5 35 43.86	+21 59 14.4	0.3	1.3	0.10	21	11 27.6	5 30 36.57	+21 55 39.7	0.3	1.3	0.10
6	14 29.5	5 35 38.65	21 59 9.9	0.3	1.3	0.10	22	11 23.5	5 30 29.33	21 55 35.4	0.3	1.3	0.10
7	14 25.5	5 35 33.34	21 59 5.4	0.3	1.3	0.10	23	11 19.5	5 30 22.12	21 55 31.2	0.3	1.3	0.10
8	14 21.5	5 35 27.93	21 59 0.9	0.3	1.3	0.10	24	11 15.4	5 30 14.94	21 55 27.0	0.3	1.3	0.10
9	14 17.5	5 35 22.42	21 58 56.4	0.3	1.3	0.10	25	11 11.4	5 30 7.79	21 55 22.9	0.3	1.3	0.10
10	14 13.4	5 35 16.83	+21 58 51.9	0.3	1.3	0.10	26	11 7.3	5 30 0.63	+21 55 18.9	0.3	1.3	0.10
11	14 9.4	5 35 11.15	21 58 47.3	0.3	1.3	0.10	27	11 3.3	5 29 53.59	21 55 14.9	0.3	1.3	0.10
12	14 5.4	5 35 5.36	21 58 42.7	0.3	1.3	0.10	28	10 59.2	5 29 46.55	21 55 10.9	0.3	1.3	0.10
13	14 1.3	5 34 59.48	21 58 38.1	0.3	1.3	0.10	29	10 55.2	5 29 39.55	21 55 7.0	0.3	1.3	0.10
14	13 57.3	5 34 53.52	21 58 33.5	0.3	1.3	0.10	30	10 51.1	5 29 32.59	21 55 3.2	0.3	1.3	0.10
15	13 53.3	5 34 47.47	+21 58 28.8	0.3	1.3	0.10	31	10 47.1	5 29 25.67	+21 54 59.4	0.3	1.3	0.10
16	13 49.3	5 34 41.34	+21 58 24.1	0.3	1.3	0.10	32	10 43.0	5 29 18.80	+21 54 55.7	0.3	1.3	0.10



PART III

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PHENOMENA

## ECLIPSES, 1898.

In the year 1898 there will be six eclipses, three of the sun and three of the moon.

I.—*A Partial Eclipse of the Moon*, 1898, January 7, visible at Washington and visible generally in the eastern portions of North America, in South America, Europe, Asia and Africa.

## ELEMENTS OF THE ECLIPSE.

Greenwich mean time of $\delta$ in right ascension, January 7				d	h	m	s
				7	12	9	48.7
Sun's right ascension	19	17	7.24	Hourly motion	10.91		
Moon's right ascension	7	17	7.24	Hourly motion	128.37		
Sun's declination	22	16	11.5 S.	Hourly motion	0 20.1 N.		
Moon's declination	23	6	51.0 N.	Hourly motion	6 41.4 S.		
Sun's equa. hor. parallax	8.9			Sun's true semidiameter	16 16.0		
Moon's equa. hor. parallax	54	33.0		Moon's true semidiameter	14 51.1		

## TIMES OF THE PHASES.

Greenwich Mean Time.			
Moon enters penumbra	January	7	9 58.7
Moon enters shadow		7	11 47.5
Middle of the eclipse		7	12 35.0
Moon leaves shadow		7	13 23.0
Moon leaves penumbra		7	15 11.2

## CIRCUMSTANCES OF THE ECLIPSE.

Contacts of Shadow with moon's limb.	Angles of position from north point.	The moon being in the zenith in longitude from Greenwich	and in latitude.
First	169° to East	4 39 E.	23 9 N.
Last	142 to West	18 26 W.	22 59 N.

Magnitude of the eclipse = 0.157 (moon's diameter = 1.0).

II.—*A Total Eclipse of the Sun*, 1898, January 21, invisible at Washington.

## ELEMENTS OF THE ECLIPSE.

Greenwich mean time of $\delta$ in right ascension, January 21				d	h	m	s
				21	19	37	26.5
Sun and moon's R. A.	20	18	32.82	Hourly motions 10.52 and 147.72			
Sun's declination	19	38	40.1 S.	Hourly motion 0 34.5 N.			
Moon's declination	19	6	27.1 S.	Hourly motion 11 34.0 N.			
Sun's equa. hor. parallax	8.9			Sun's true semidiameter 16 15.0			
Moon's equa. hor. parallax	60	11.6		Moon's true semidiameter 16 23.3			

## CIRCUMSTANCES OF THE ECLIPSE.

				Longitude from Greenwich.	Latitude.
Eclipse begins	January	21	16 45.9	21 38.7 E.	0 28.9 N.
Central eclipse begins		21	17 48.7	9 49.7 E.	11 11.1 N.
Central eclipse at noon		21	19 37.4	68 36.0 E.	12 53.7 N.
Central eclipse ends		21	20 49.7	119 5.8 E.	45 47.1 N.
Eclipse ends		21	21 52.6	110 4.0 E.	35 36.9 N.

III.—*A Partial Eclipse of the Moon*, 1898, July 3, invisible at Washington, but visible generally in Europe, Asia and Africa.

## ELEMENTS OF THE ECLIPSE.

Greenwich mean time of $\delta$ in right ascension, July				<sup>d</sup>	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	
				3	9	7	13.6	
Sun's right ascension	<sup>h</sup>	<sup>m</sup>	<sup>s</sup>	6	51	39.29	Hourly motion	10.31
Moon's right ascension	18	51	39.29				Hourly motion	163.64
Sun's declination	22°	55'	18.6 N.				Hourly motion	0 12.7 S.
Moon's declination	23	27	57.6 S				Hourly motion	6 51.2 N.
Sun's equa. hor. parallax			8.7				Sun's true semidiameter	15 44.0
Moon's equa. hor. parallax	61	21.4					Moon's true semidiameter	16 42.3

## TIMES OF THE PHASES.

Moon enters penumbra	July	<sup>d</sup>	<sup>h</sup>	<sup>m</sup>	} Greenwich Mean Time.
		3	6	46.0	
Moon enters shadow		3	7	45.5	
Middle of the eclipse		3	9	17.4	
Moon leaves shadow		3	10	49.2	
Moon leaves penumbra		3	11	48.4	

## CIRCUMSTANCES OF THE ECLIPSE.

Contacts of Shadow with moon's limb.	Angles of position from north point.	The moon being in the zenith in longitude from Greenwich	and in latitude.
First	49° to East	63° 45' E.	23° 37' S.
Last	71° to West	19° 48' E.	23° 16' S.

Magnitude of the eclipse = 0.934 (moon's diameter = 1.0).

IV.—*An Annular Eclipse of the Sun*, 1898, July 18, invisible at Washington.

## ELEMENTS OF THE ECLIPSE.

Greenwich mean time of $\delta$ in right ascension, July				<sup>d</sup> 18	<sup>h</sup> 8	<sup>m</sup> 6	<sup>s</sup> 53.4
Sun and moon's R. A.	<sup>h</sup> 7	<sup>m</sup> 52	<sup>s</sup> 35.88	Hourly motions	<sup>s</sup> 10.04	and	<sup>s</sup> 122.15
Sun's declination	20°	55'	58.9 N.	Hourly motion	0	26.9	S.
Moon's declination	20	7	46.8 N.	Hourly motion	8	14.8	S.
Sun's equa. hor. parallax			8.7	Sun's true semidiameter	15	44.5	
Moon's equa. hor. parallax	54	10.5		Moon's true semidiameter	14	45.0	

## CIRCUMSTANCES OF THE ECLIPSE.

		<sup>d</sup>	<sup>h</sup>	<sup>m</sup>	Longitude from Greenwich.	Latitude.
Eclipse begins	July	18	5	2.3	157° 55.5 W.	15° 39.0 S.
Central eclipse begins		18	6	36.1	169 19.2 W.	39 14.2 S.
Central eclipse at noon		18	8	6.9	120 13.4 W.	42 34.3 S.
Central eclipse ends		18	8	37.5	92 16.3 W.	64 45.3 S.
Eclipse ends		18	10	11.4	84 18.5 W.	45 34.8 S.

V.—*A Partial Eclipse of the Sun*, 1898, December 12–13, invisible at Washington.

*ELEMENTS OF THE ECLIPSE.*

Greenwich mean time of $\delta$ in right ascension, December				d	h	m	s
				12	23	53	16.4
Sun and moon's R. A.	h	m	s	17	23	12.96	
				Hourly motions			
				11.05 and 165.68			
Sun's declination	23	10	59.7 S.	Hourly motion			
				0 9.7 S.			
Moon's declination	24	43	44.9 S.	Hourly motion			
				0 55.0 N.			
Sun's equa. hor. parallax	8.9			Sun's true semidiameter			
				16 15.2			
Moon's equa. hor. parallax	60	55.2		Moon's true semidiameter			
				16 35.2			

*CIRCUMSTANCES OF THE ECLIPSE.*

		d	h	m	Longitude from Greenwich.	Latitude.
Eclipse begins	December	12	23	38.4	162° 41.4 W.	66° 15.2 S.
Middle of the eclipse		12	23	58.3	174 31.2 E.	66 45.3 S.
Eclipse ends		13	0	18.1	152 24.9 E.	65 15.6 S.

Magnitude of greatest eclipse = 0.023 (sun's diameter = 1.0).

VI.—*A Total Eclipse of the Moon*, 1898, December 27, visible at Washington, the moon rising eclipsed; and visible generally throughout North and South America, Europe, Asia and Africa.

*ELEMENTS OF THE ECLIPSE.*

Greenwich mean time of $\delta$ in right ascension, December 27				d	h	m	s
				27	11	37	52.0
Sun's right ascension	h	m	s	Hourly motion			
	18	27	29.45	11.08			
Moon's right ascension	6	27	29.45	Hourly motion			
				128.63			
Sun's declination	23	18'	7.5 S.	Hourly motion			
				0' 7.3 N.			
Moon's declination	23	30	53.2 N.	Hourly motion			
				4 9.4 S.			
Sun's equa. hor. parallax	8.9			Sun's true semidiameter			
				16 16.1			
Moon's equa. hor. parallax	54	6.4		Moon's true semidiameter			
				14 43.9			

*TIMES OF THE PHASES.*

	d	h	m	} Greenwich Mean Time.
Moon enters penumbra	December	27	8 32.9	
Moon enters shadow		27	9 47.5	
Total eclipse begins		27	10 57.5	
Middle of eclipse		27	11 42.1	
Total eclipse ends		27	12 26.7	
Moon leaves shadow		27	13 36.4	
Moon leaves penumbra		27	14 50.7	

*CIRCUMSTANCES OF THE ECLIPSE.*

Contacts of Shadow with moon's limb.	Angles of position from north point.	The moon being in the zenith in longitude from Greenwich	and in latitude.
First	112° to East	32° 37' E.	23° 38' N.
Last	95 to West	22 43 W.	23 22 N.

Magnitude of the eclipse = 1.384 (moon's diameter = 1.0).

The regions within which the first two eclipses of the sun are visible, are laid down on the accompanying charts, from which, by means of the dotted lines, the Greenwich time of beginning and ending may also be found, within fifteen or twenty minutes.

**BESSELIAN ELEMENTS OF THE TOTAL ECLIPSE  
OF THE SUN, 1898, JANUARY 21.**

Greenwich Mean Time.	Co-ordinates of Centre of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra and Shadow On Fundamental Plane.	
	<i>x</i>	<i>y</i>	Log sin <i>d</i>	Log cos <i>d</i>	<i>μ</i>	<i>l</i>	<i>l'</i>
<sup>h</sup> <sup>m</sup>							
16 40	-1.59660	-0.00435	-9.52718	+9.97388	247 2.7	+0.54321	-0.00269
50	1.50661	+0.02608	9.52714	9.97388	249 32.6	0.54324	0.00265
17 0	-1.41662	+0.05652	-9.52711	+9.97389	252 2.6	+0.54327	-0.00262
10	1.32663	0.08696	9.52708	9.97389	254 32.6	0.54330	0.00259
20	1.23665	0.11741	9.52705	9.97390	257 2.6	0.54332	0.00257
30	1.14667	0.14786	9.52701	9.97390	259 32.6	0.54335	0.00254
40	1.05669	0.17832	9.52698	9.97391	262 2.6	0.54337	0.00252
50	0.96671	0.20879	9.52695	9.97391	264 32.6	0.54340	0.00250
18 0	-0.87673	+0.23927	-9.52692	+9.97392	267 2.6	+0.54342	-0.00248
10	0.78674	0.26976	9.52689	9.97392	269 32.5	0.54344	0.00246
20	0.69676	0.30025	9.52685	9.97393	272 2.5	0.54346	0.00244
30	0.60678	0.33075	9.52682	9.97393	274 32.5	0.54347	0.00242
40	0.51680	0.36125	9.52679	9.97393	277 2.5	0.54349	0.00240
50	0.42682	0.39175	9.52676	9.97394	279 32.5	0.54351	0.00238
19 0	-0.33684	+0.42226	-9.52672	+9.97394	282 2.5	+0.54352	-0.00237
10	0.24687	0.45278	9.52669	9.97394	284 32.5	0.54354	0.00235
20	0.15690	0.48331	9.52666	9.97395	287 2.4	0.54355	0.00234
30	-0.06693	0.51384	9.52663	9.97395	289 32.4	0.54357	0.00233
40	+0.02304	0.54439	9.52660	9.97395	292 2.4	0.54358	0.00231
50	0.11301	0.57493	9.52656	9.97396	294 32.4	0.54360	0.00230
20 0	+0.20297	+0.60548	-9.52653	+9.97396	297 2.4	+0.54361	-0.00229
10	0.29292	0.63604	9.52650	9.97397	299 32.4	0.54362	0.00228
20	0.38287	0.66660	9.52647	9.97397	302 2.4	0.54363	0.00227
30	0.47281	0.69716	9.52644	9.97398	304 32.3	0.54364	0.00226
40	0.56275	0.72773	9.52640	9.97398	307 2.3	0.54365	0.00225
50	0.65269	0.75830	9.52637	9.97399	309 32.3	0.54366	0.00224
21 0	+0.74262	+0.78888	-9.52634	+9.97399	312 2.3	+0.54367	-0.00223
10	0.83255	0.81947	9.52630	9.97399	314 32.3	0.54368	0.00222
20	0.92247	0.85007	9.52627	9.97400	317 2.3	0.54369	0.00222
30	1.01239	0.88067	9.52624	9.97400	319 32.3	0.54370	0.00221
40	1.10230	0.91127	9.52621	9.97400	322 2.3	0.54370	0.00221
50	1.19220	0.94188	9.52618	9.97401	324 32.2	0.54371	0.00220
22 0	+1.28210	+0.97249	-9.52614	+9.97401	327 2.2	+0.54371	-0.00220

Greenwich Mean Time.	Log $\Delta x$ for 1 Minute.	Log $\Delta y$ for 1 Minute.	Log $\Delta \mu$ for 1 Minute.	Log Tangents of Angles of Cones—	
				Penumbra.	Shadow.
<sup>h</sup> <sup>m</sup>					
17 0	+7.9541	+7.4835	+1.1761	+7.67674	+7.67457
18 0	7.9542	7.4840	1.1761	7.67674	7.67457
19 0	7.9541	7.4845	1.1761	7.67674	7.67457
20 0	7.9540	7.4850	1.1761	7.67674	7.67457
21 0	7.9539	7.4855	1.1761	7.67673	7.67457
22 0	+7.9537	+7.4860	+1.1761	+7.67673	+7.67456

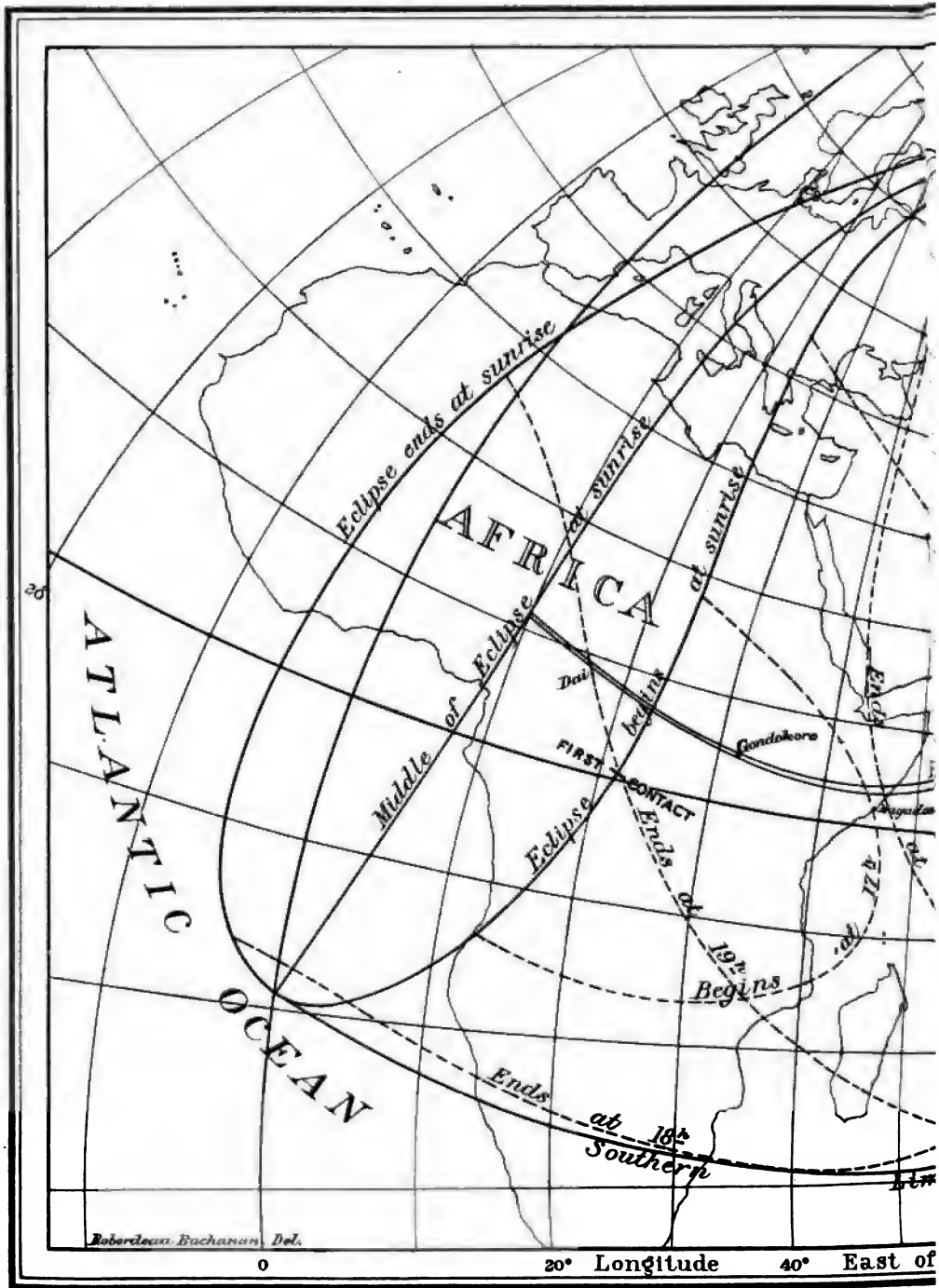
**PATH OF THE SHADOW DURING THE TOTAL ECLIPSE  
OF THE SUN, 1898, JANUARY 21.**

Greenwich Mean Time.	Northern Limit of Shadow Path.		Central Line.		Southern Limit of Shadow Path.		Duration of Totality in Central Line.
	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	
<b>Limits.</b>	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	m s
17 <sup>h</sup> 50 <sup>m</sup>	+11 17.5	9 51.5 E.	+11 11.1	9 49.7 E.	+11 2.5	9 48.3 E.	
	9 3.3	17 6.3	8 43.1	17 31.0	8 22.9	17 55.7	0 48.7
55	6 21.2	26 2.5	6 2.3	26 15.6	5 43.4	26 28.7	1 3.2
18 0	+ 5 14.1	31 8.0	+ 4 54.5	31 19.1	+ 4 34.9	31 30.2	1 14.6
5	4 35.6	35 1.3	4 15.3	35 11.6	3 55.0	35 21.9	1 24.1
10	4 14.0	38 14.5	3 53.0	38 24.5	3 32.0	38 34.5	1 32.5
15	4 3.7	41 1.7	3 42.2	41 11.6	3 20.7	41 21.5	1 39.8
20	4 2.3	43 30.6	3 40.3	43 40.6	3 18.3	43 50.6	1 46.5
25	4 7.8	45 45.3	3 45.5	45 55.5	3 23.2	46 5.7	1 52.4
30	+ 4 19.4	47 49.5	+ 3 56.8	47 59.9	+ 3 34.2	48 10.3	1 57.7
35	4 36.0	49 45.1	4 13.2	49 55.6	3 50.4	50 6.1	2 2.4
40	4 57.2	51 33.2	4 34.2	51 43.9	4 11.2	51 54.6	2 6.5
45	5 22.5	53 15.5	4 59.4	53 26.5	4 36.3	53 37.5	2 10.1
50	5 51.7	54 52.9	5 28.6	55 4.2	5 5.5	55 15.5	2 13.1
55	6 24.5	56 26.4	6 1.4	56 37.9	5 38.3	56 49.4	2 15.5
19 0	+ 7 0.7	57 56.6	+ 6 37.7	58 8.3	+ 6 14.7	58 20.0	2 17.3
5	7 40.3	59 24.1	7 17.4	59 35.9	6 54.5	59 47.7	2 18.5
10	8 23.2	60 49.4	8 0.4	61 1.4	7 37.6	61 13.4	2 19.1
15	9 9.2	62 13.2	8 46.5	62 25.3	8 23.8	62 37.4	2 19.4
20	9 58.3	63 36.0	9 35.8	63 48.2	9 13.3	64 0.4	2 19.1
25	10 50.6	64 58.3	10 28.3	65 10.5	10 6.0	65 22.7	2 18.3
30	+11 46.1	66 20.5	+11 24.1	66 32.7	+11 2.1	66 44.9	2 17.0
35	12 45.2	67 43.2	12 23.4	67 55.3	12 1.6	68 7.4	2 15.1
40	13 47.8	69 7.1	13 26.3	69 19.0	13 4.8	69 30.9	2 12.7
45	14 54.1	70 32.6	14 32.8	70 44.3	14 11.5	70 56.0	2 9.9
50	16 4.2	72 0.5	15 43.2	72 12.0	15 22.2	72 23.5	2 6.7
55	17 19.5	73 31.6	16 57.8	73 42.8	16 37.1	73 54.0	2 3.0
20 0	+18 37.5	75 7.0	+18 17.1	75 17.9	+17 56.7	75 28.8	1 58.9
5	20 1.6	76 47.7	19 41.5	76 58.2	19 21.4	77 8.7	1 54.2
10	21 31.7	78 36.0	21 11.9	78 45.8	20 52.1	78 55.6	1 49.1
15	23 8.6	80 33.4	22 49.1	80 42.5	22 29.6	80 51.6	1 43.5
20	24 53.5	82 42.3	24 34.3	82 50.6	24 15.1	82 58.9	1 37.5
25	26 47.9	85 7.5	26 28.9	85 14.6	26 9.9	85 21.7	1 30.9
30	+28 55.4	87 55.5	+28 36.7	88 1.2	+28 18.0	88 6.9	1 23.6
35	31 20.4	91 17.0	31 1.9	91 20.7	30 43.4	91 24.4	1 15.4
40	34 12.4	95 34.9	33 54.1	95 35.5	33 35.8	95 36.1	1 5.9
45	37 56.4	101 49.5	37 37.5	101 44.2	37 18.6	101 38.9	0 54.2
<b>Limits.</b>	+45 52.0	119 0.2 E.	+45 47.1	119 5.8 E.	+45 36.2	119 9.5 E.	



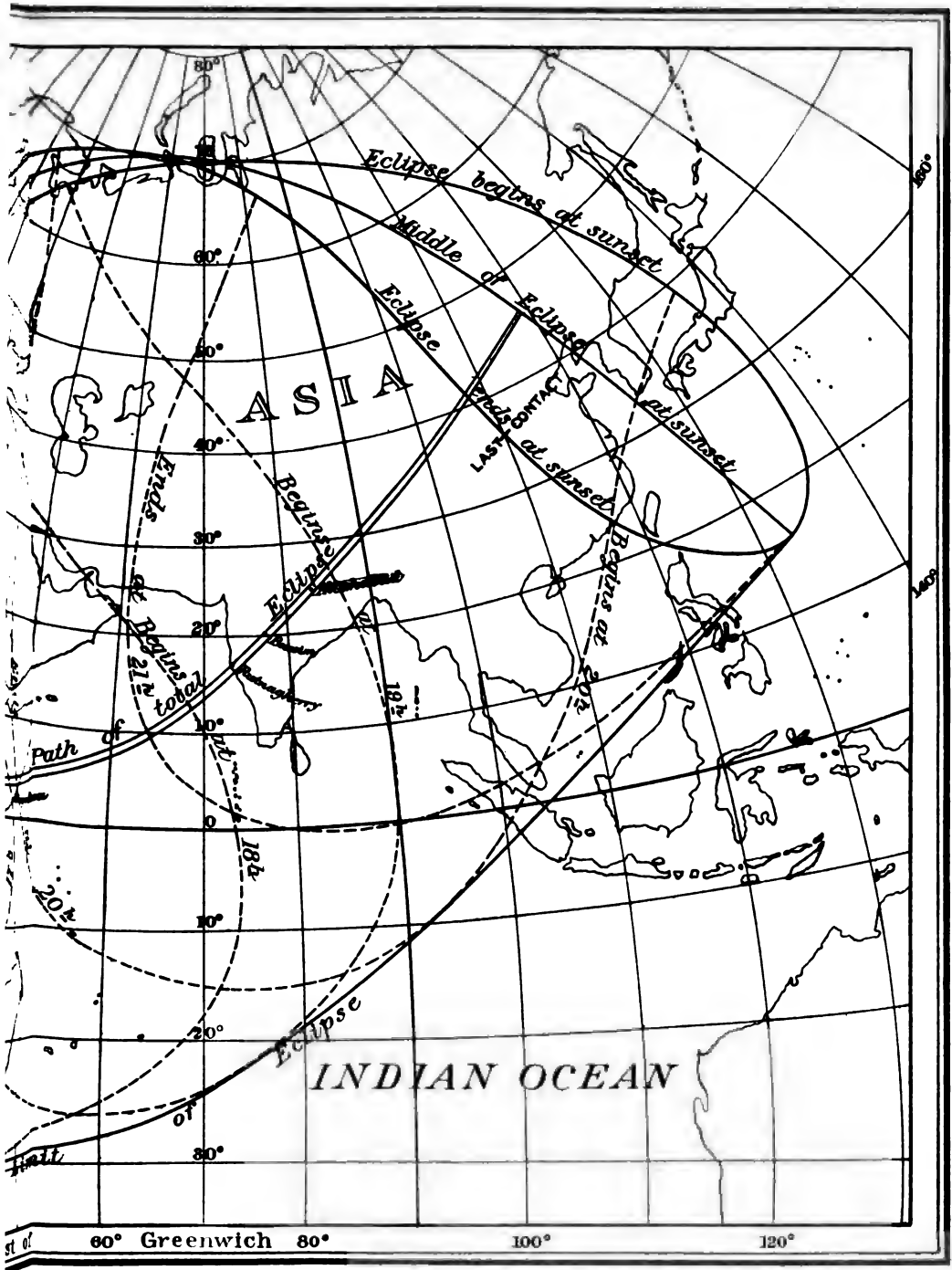


# TOTAL ECLIPSE OF



Note - The hours of beginning and end

OF JANUARY 21<sup>ST</sup> 1898.



all readings are expressed in Greenwich Mean Time.



**BESSELIAN ELEMENTS OF THE ANNULAR ECLIPSE  
OF THE SUN, 1898, JULY 18.**

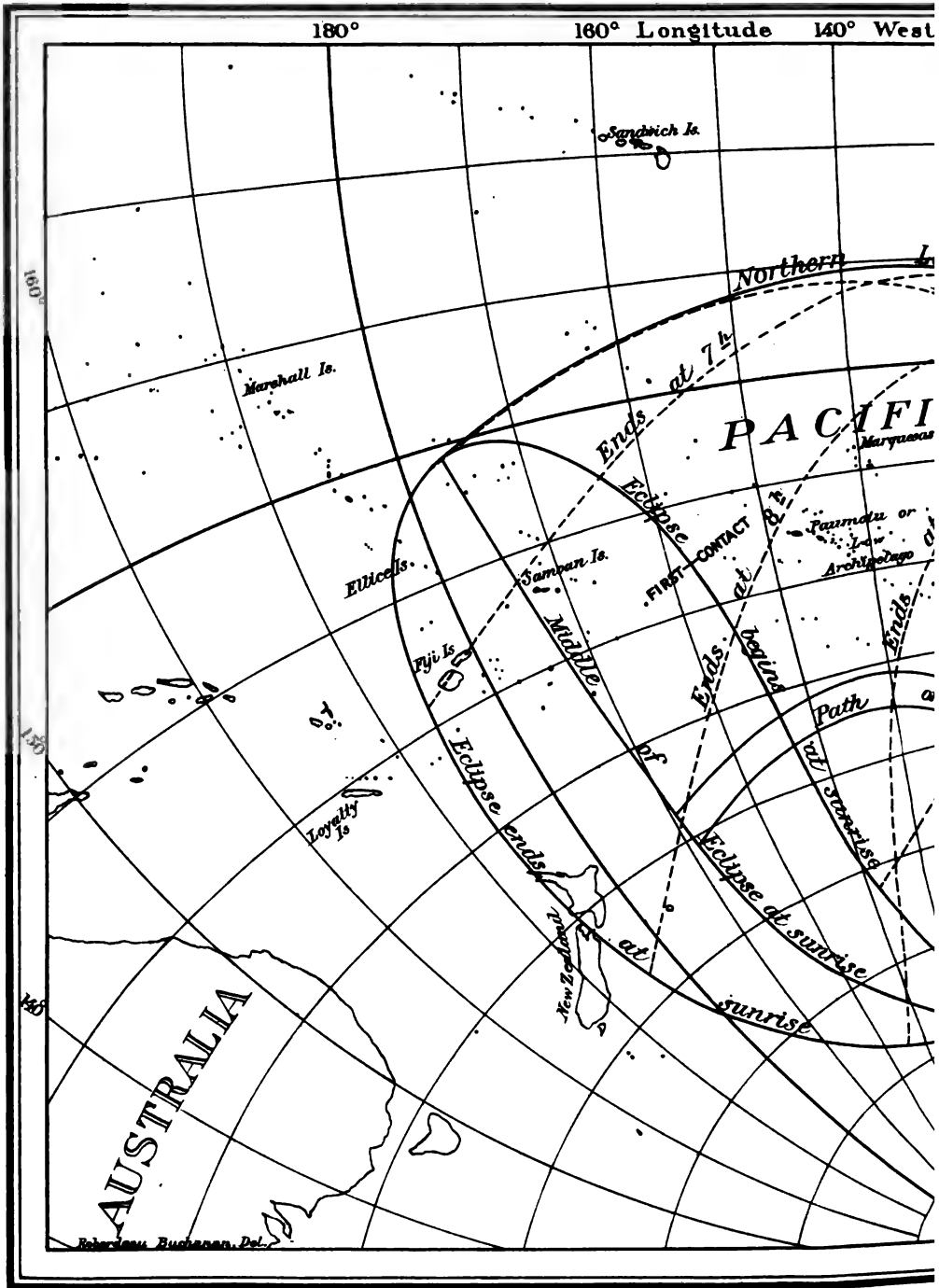
Greenwich Mean Time.	Co-ordinates of Centre of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra and Shadow On Fundamental Plane.	
	$x$	$y$	Log sin $d$	Log cos $d$	$\mu$	$l$	$l'$
h m							
5 0	-1.51723	-0.44379	+9.55348	+9.97029	73 29.9	+0.56440	+0.01840
10	1.43604	0.46773	9.55345	9.97029	75 59.9	0.56440	0.01840
20	1.35485	0.49168	9.55343	9.97029	78 29.9	0.56440	0.01840
30	1.27366	0.51563	9.55341	9.97029	80 59.9	0.56440	0.01840
40	1.19247	0.53959	9.55338	9.97030	83 30.0	0.56440	0.01840
50	1.11129	0.56355	9.55336	9.97030	86 0.0	0.56440	0.01840
6 0	-1.03011	-0.58752	+9.55334	+9.97030	88 30.0	+0.56440	+0.01840
10	0.94893	0.61150	9.55331	9.97030	91 0.0	0.56439	0.01839
20	0.86775	0.63548	9.55329	9.97031	93 30.0	0.56439	0.01839
30	0.78657	0.65947	9.55327	9.97031	96 0.0	0.56439	0.01839
40	0.70539	0.68346	9.55324	9.97031	98 30.0	0.56438	0.01838
50	0.62421	0.70746	9.55322	9.97032	101 0.0	0.56438	0.01838
7 0	-0.54303	-0.73146	+9.55320	+9.97032	103 30.0	+0.56438	+0.01838
10	0.46184	0.75547	9.55317	9.97032	106 0.0	0.56437	0.01837
20	0.38066	0.77948	9.55315	9.97033	108 30.0	0.56437	0.01837
30	0.29948	0.80350	9.55313	9.97033	111 0.0	0.56436	0.01836
40	0.21830	0.82752	9.55310	9.97033	113 30.0	0.56435	0.01835
50	0.13712	0.85155	9.55308	9.97034	116 0.0	0.56434	0.01834
8 0	-0.05594	-0.87558	+9.55306	+9.97034	118 30.0	+0.56434	+0.01834
10	+0.02524	0.89962	9.55303	9.97034	121 0.0	0.56433	0.01833
20	0.10642	0.92366	9.55301	9.97035	123 30.0	0.56433	0.01832
30	0.18760	0.94771	9.55299	9.97035	126 0.0	0.56432	0.01831
40	0.26877	0.97176	9.55296	9.97035	128 30.0	0.56431	0.01830
50	0.34994	0.99582	9.55294	9.97036	131 0.0	0.56430	0.01829
9 0	+0.43111	-1.01988	+9.55292	+9.97036	133 30.1	+0.56429	+0.01828
10	0.51227	1.04395	9.55289	9.97036	136 0.1	0.56428	0.01827
20	0.59343	1.06802	9.55287	9.97037	138 30.1	0.56427	0.01826
30	0.67459	1.09210	9.55285	9.97037	141 0.1	0.56426	0.01825
40	0.75575	1.11618	9.55282	9.97037	143 30.1	0.56424	0.01823
50	0.83691	1.14027	9.55280	9.97038	146 0.1	0.56423	0.01822
10 0	+0.91806	-1.16436	+9.55278	+9.97038	148 30.1	+0.56421	+0.01820
10	0.99921	1.18846	9.55275	9.97038	151 0.1	0.56419	0.01818
20	+1.08036	-1.21256	+9.55273	+9.97039	153 30.1	+0.56417	+0.01816

Greenwich Mean Time.	Log $\Delta x$ for 1 Minute.	Log $\Delta y$ for 1 Minute.	Log $\Delta \mu$ for 1 Minute.	Log Tangents of Angles of Cones—	
				Penumbra.	Shadow.
h m					
5 0	+7.9095	-7.3791	+1.1761	+7.66302	+7.66085
6 0	7.9095	7.3797	1.1761	7.66302	7.66085
7 0	7.9095	7.3803	1.1761	7.66302	7.66086
8 0	7.9094	7.3808	1.1761	7.66302	7.66086
9 0	7.9094	7.3814	1.1761	7.66303	7.66086
10 0	+7.9093	-7.3819	+1.1761	+7.66303	+7.66086

PATH OF THE ANNULUS DURING THE ANNULAR ECLIPSE OF THE SUN, 1898, JULY 18.							
Greenwich Mean Time.	Northern Limit of Annulus Path.		Central Line.		Southern Limit of Annulus Path.		Duration of Annulus on Central Line.
	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	Latitude.	Longitude from Greenwich.	
Limits.	° ' "	° ' "	° ' "	° ' "	° ' "	° ' "	m s
6 <sup>h</sup> 40 <sup>m</sup>	-37 21.5	169 40.1 W.	-39 14.2	169 19.2 W.	-40 58.8	168 54.9 W.	
45	32 5.1	153 42.1	35 12.3	158 4.6	38 19.5	162 27.1	5 26.8
50	31 26.0	150 15.3	33 49.4	152 49.3	36 12.8	155 23.3	5 37.8
55	31 0.8	147 10.2	33 7.4	149 7.4	35 14.0	151 4.6	5 45.9
7 0	30 49.6	144 32.0	32 46.6	146 9.2	34 43.6	147 46.4	5 52.5
5	-30 48.7	142 12.4	-32 39.7	143 37.2	-34 30.7	145 2.0	5 57.9
10	30 56.3	140 7.0	32 43.1	141 22.7	34 29.9	142 38.4	6 2.4
15	31 11.1	138 10.9	32 54.7	139 20.3	34 38.3	140 29.7	6 5.9
20	31 32.8	136 23.2	33 14.1	137 27.4	34 55.4	138 32.6	6 8.6
25	32 0.2	134 41.2	33 39.9	135 41.2	35 19.6	136 41.2	6 10.6
30	32 31.9	133 3.1	34 10.7	133 59.6	35 49.5	134 56.1	6 11.9
35	-33 8.9	131 28.1	-34 47.3	132 21.7	-36 25.7	133 15.3	6 12.6
40	33 51.5	129 55.1	35 29.9	130 46.2	37 8.3	131 37.3	6 12.5
45	34 39.6	128 23.2	36 18.5	129 11.9	37 57.4	130 0.6	6 11.8
50	35 33.0	126 51.5	37 12.8	127 37.8	38 52.6	128 24.1	6 10.5
55	36 32.3	125 18.6	38 13.6	126 2.4	39 54.9	126 46.2	6 8.5
8 0	37 37.4	123 43.6	39 21.0	124 24.9	41 4.6	125 6.2	6 6.1
5	-38 49.7	122 4.8	-40 36.4	122 43.2	-42 23.1	123 21.6	6 3.0
10	40 9.7	120 21.0	42 0.5	120 55.8	43 51.3	121 30.6	5 59.3
15	41 38.2	118 30.1	43 34.7	119 0.4	45 31.2	119 30.7	5 55.0
20	43 17.2	116 29.1	45 21.9	116 53.0	47 26.6	117 16.9	5 50.1
25	45 9.6	114 14.0	47 26.3	114 27.9	49 43.0	114 41.8	5 44.5
30	47 21.4	111 37.0	49 57.6	111 33.8	52 33.8	111 30.6	5 38.0
35	-49 52.4	108 30.3	-53 5.5	107 50.3	-56 18.6	107 10.3	5 30.2
Limits.	52 39.3	104 58.9	57 53.9	101 53.2	63 8.5	98 47.5	5 19.4
	-63 32.4	89 2.7 W.	-64 45.3	92 16.3 W.	-65 44.7	95 15.5 W.	
BESSELIAN ELEMENTS OF THE PARTIAL ECLIPSE OF THE SUN, 1898, DECEMBER 12-13.							
Greenwich Mean Time.	Co-ordinates of Centre of Shadow on Fundamental Plane.		Direction of Axis of Shadow.			Radius of Penumbra on Fundamental Plane.	
	$x$	$y$	Log sin $d$	Log cos $d$	$\mu$	$l$	
h m							
23 30	-0.22413	-1.53315	-9.59505	+9.96344	353 53.1	+0.54032	
40	0.12784	1.53016	9.59506	9.96344	356 23.1	0.54031	
50	-0.03154	1.52716	9.59507	9.96344	358 53.0	0.54030	
0 0	+0.06476	-1.52414	-9.59508	+9.96344	1 23.0	+0.54029	
10	0.16105	1.52110	9.59509	9.96344	3 53.0	0.54028	
20	+0.25735	-1.51804	-9.59510	+9.96344	6 22.9	+0.54027	
Greenwich Mean Time.	Log $\Delta x$ for 1 Minute.		Log $\Delta y$ for 1 Minute.		Log $\Delta \mu$ for 1 Minute.	Log Tangents of Angle of Cone—	
						Penumbra.	
h m							
23 0	+7.9836		+6.4680		+1.1761	+7.67463	
0 0	7.9836		6.4807		1.1761	7.67463	
1 0	+7.9836		+6.4932		+1.1761	+7.67463	



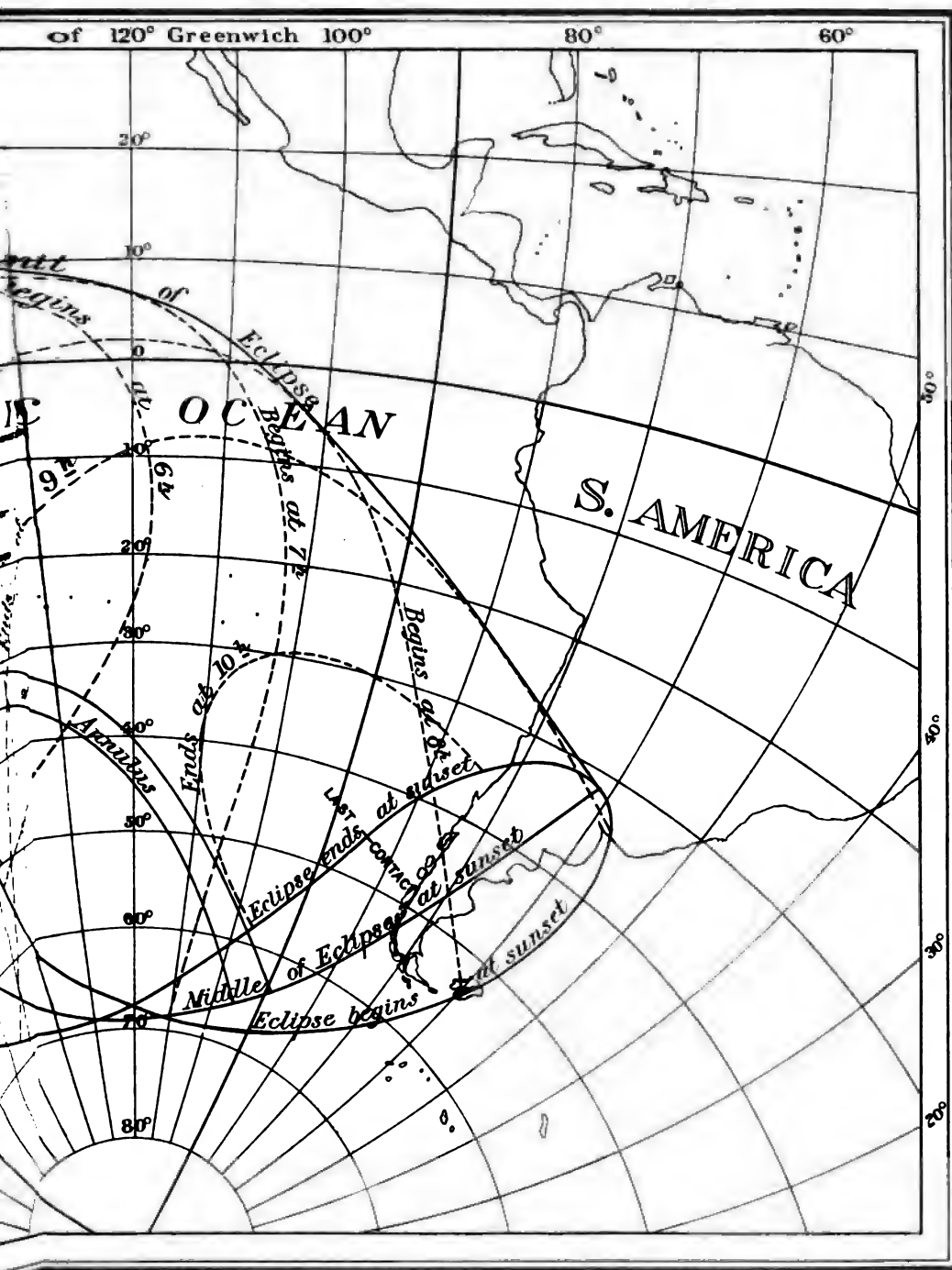
# ANNULAR ECLIPS



Note.- The hours of beginning



# E OF JULY 18<sup>TH</sup> 1898.



beginning and ending are expressed in Greenwich Mean Time.



## WASHINGTON MEAN TIME.

## PHASES OF THE MOON.

New Moon.			First Quarter.			Full Moon.			Last Quarter.		
d	h	m	d	h	m	d	h	m	d	h	m
January	21	14 16.5	January	28	21 24.5	January	7	7 16.1	January	14	22 36.3
February	20	2 32.4	February	27	18 5.1	February	6	1 16.0	February	13	7 26.5
March	21	15 28.9	March	29	14 32.0	March	7	16 20.5	March	14	14 39.8
April	20	5 12.5	April	28	8 56.5	April	6	4 11.4	April	12	21 20.2
May	19	19 50.0	May	28	0 5.7	May	5	13 25.5	May	12	4 27.6
June	18	11 11.1	June	26	11 45.8	June	3	21 3.1	June	10	12 55.9
July	18	2 39.0	July	25	20 31.7	July	3	4 3.9	July	9	23 34.6
August	16	17 25.9	August	24	3 23.9	August	1	11 20.6	August	8	13 4.8
September	15	7 2.0	September	22	9 31.2	August	30	19 42.6	September	7	5 42.6
October	14	19 29.1	September	29	6 2.3	September	29	6 2.3	October	7	0 56.5
November	13	7 12.1	October	21	16 1.0	October	28	19 10.0	November	5	21 19.5
December	12	18 34.9	November	19	23 56.7	November	27	11 31.0	December	5	16 57.4
			December	19	10 13.4	December	27	6 31.0			

## APOGEE, PERIGEE, AND GREATEST LIBRATION.

Apogee.		Perigee.		Greatest Libration.							
	d h		d h		d h m		d h m		d h m		
January	3 23.2	January	19 19.4	January	12 23 35 E.	January	25 12 53 W.				
January	31 15.6	February	16 14.2	February	8 12 7 E.	February	22 10 56 W.				
February	28 12.1	March	13 21.8	March	6 22 19 E.	March	21 15 53 W.				
March	28 8.4	April	9 5.1	April	3 9 2 E.	April	16 21 51 W.				
April	25 2.3	May	7 3.7	May	1 8 5 E.	May	13 20 19 W.				
May	22 15.4	June	4 11.3	May	29 12 16 E.	June	10 17 11 W.				
June	18 20.9	July	2 21.0	June	26 17 4 E.	July	8 21 17 W.				
July	16 0.9	July	31 5.5	July	24 17 10 E.	August	6 2 4 W.				
August	12 12.0	August	28 8.2	August	21 1 8 E.	September	3 3 5 W.				
September	9 4.5	September	24 11.9	September	16 7 37 E.	September	30 18 50 W.				
October	6 23.8	October	19 8.8	October	13 4 0 E.	October	27 14 54 W.				
November	3 20.1	November	15 14.6	November	9 20 53 E.	November	22 19 22 W.				
December	1 14.7	December	13 20.2	December	8 0 41 E.	December	20 5 50 W.				
December	29 1.3										

## FORMULÆ FOR THE LIBRATION OF THE MOON.

Put  $I$ , the inclination of the moon's equator to the ecliptic ( $=1^\circ 28' 8''$ ),

$\Omega$ , the mean longitude of the moon's ascending node, (see page 278), or the mean longitude of the descending node of the moon's equator,

$C$ , the angle at the centre of the moon's disk made by a lunar meridian with the circle of declination, counted from north to east on the apparent disk,

$\lambda, \beta, \alpha', \delta'$  the apparent longitude, latitude, right ascension, and declination of the moon, corrected for parallax,

$\lambda'$ , the selenocentric longitude of the earth, counted on the moon's equator from its descending node,  $\Omega$ ,

$i, \Delta, \Omega', C$ , the quantities defined on page 276, where their values for the year are given.

The moon's libration in longitude and latitude may then be found, for any time, by means of the following formulæ, in connection with the tables given on pages 276 and 277:—

$$\left. \begin{aligned} \Delta \lambda &= -0'.57 \sin 2 (\Omega - \lambda) \\ a &= \sin I \cos (\Omega - \lambda) \\ \tan B &= \tan I \sin (\Omega - \lambda) \\ \lambda' &= \lambda + \Delta \lambda + a b \end{aligned} \right\} \text{ See table, page 277.}$$

$$\begin{aligned} \text{The libration in latitude} &= b = B - \beta \\ \text{The libration in longitude} &= l = \lambda' - C \\ \sin C &= \sin i \frac{\cos (\lambda' + \Delta - \Omega)}{\cos \delta'} = - \sin i \frac{\cos (\alpha' - \Omega')}{\cos \delta} \end{aligned}$$

MEAN PLACES FOR 1898.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.382, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ' "	"
36 Piscium . . . . .	6.3	0 11 19.547	-0.0025	+ 7 40 25.76	-0.009
♌ Piscium . . . . .	5.3	0 15 20.912	-0.0001	7 37 25.39	+0.011
45 Piscium . . . . .	6.9	0 20 26.350	+0.0015	7 7 38.17	-0.053
58 Piscium . . . . .	5.0	0 41 42.126	+0.0025	11 25 4.18	-0.015
75 Piscium . . . . .	6.0	1 1 11.648	+0.0014	12 24 33.41	+0.031
101 Piscium . . . . .	6.3	1 30 19.112	-0.0005	+14 8 23.81	-0.015
103 Piscium . . . . .	6.8	1 33 45.306	-0.0014	16 6 28.48	-0.026
105 Piscium . . . . .	6.3	1 34 10.534	+0.0040	15 53 18.10	-0.011
3 Arietis . . . . .	6.0	1 41 2.896	+0.0014	16 54 5.46	-0.014
4 Arietis . . . . .	5.7	1 42 38.872	+0.0024	16 26 52.28	-0.021
♈ Arietis . . . . .	5.7	1 51 46.620	+0.0020	+17 19 9.79	-0.032
15 Arietis . . . . .	5.7	2 4 58.309	+0.0056	19 1 8.26	-0.038
B. A. C. 686 . . . . .	7.2	2 8 12.112	+0.0011	19 8 11.75	0.000
♊ Arietis . . . . .	5.7	2 12 27.029	-0.0012	19 25 45.12	-0.008
23 Arietis . . . . .	7.5	2 13 28.385	-0.0018	19 13 15.46	-0.116
26 Arietis . . . . .	6.0	2 24 55.090	+0.0047	+19 24 9.02	-0.032
B. A. C. 782 . . . . .	7.0	2 27 54.204	+0.0050	18 25 48.77	+0.008
♋ Arietis . . . . .	5.7	2 33 1.371	-0.0008	21 31 13.96	-0.011
μ Arietis . . . . .	6.0	2 36 36.835	+0.0018	19 34 36.14	-0.055
47 Arietis . . . . .	6.0	2 52 14.830	+0.0152	20 15 34.79	-0.029
66 Arietis . . . . .	6.0	3 22 28.717	-0.0002	+20 27 8.35	-0.124
7 Tauri . . . . .	6.0	3 28 24.081	+0.0006	24 7 19.35	-0.043
9 Tauri . . . . .	7.0	3 30 58.067	-0.0011	22 52 23.84	-0.053
11 Tauri . . . . .	6.7	3 34 40.685	+0.0004	24 59 58.15	-0.021
♋ Pleiadum . . . . .	6.3	3 38 44.323	+0.0009	23 58 6.35	-0.059
17 Tauri . . . . .	4.3	3 38 49.015	+0.0008	+23 47 32.81	-0.059
18 Tauri . . . . .	6.3	3 39 4.542	+0.0009	24 31 8.12	-0.059
19 Tauri . . . . .	5.0	3 39 8.086	+0.0009	24 8 49.27	-0.059
20 Tauri . . . . .	5.0	3 39 45.329	+0.0009	24 2 55.77	-0.059
21 Tauri . . . . .	7.0	3 39 49.791	+0.0009	24 14 8.83	-0.059
22 Tauri . . . . .	7.0	3 39 58.327	+0.0009	+24 12 33.04	-0.059
23 Tauri . . . . .	4.7	3 40 16.231	+0.0009	23 37 49.62	-0.059
B. A. C. 1170 . . . . .	6.3	3 42 18.426	0.0000	23 6 27.77	-0.048
26 Tauri . . . . .	7.0	3 42 53.224	+0.0009	23 32 39.46	-0.059
27 Tauri . . . . .	4.0	3 43 5.722	+0.0009	23 44 29.04	-0.059
28 Tauri . . . . .	6.2	3 43 6.982	+0.0009	+23 49 29.21	-0.059
33 Tauri . . . . .	6.3	3 51 1.042	+0.0044	22 52 45.01	-0.020
B. A. C. 1238 . . . . .	6.3	3 54 53.246	-0.0003	22 54 50.86	-0.025
36 Tauri . . . . .	6.0	3 58 15.601	0.0000	23 49 29.74	-0.024
♉ Tauri . . . . .	6.0	4 4 37.080	-0.0003	26 12 52.68	-0.048
♊ Tauri . . . . .	5.7	4 16 22.521	+0.0032	+25 23 18.60	-0.037
62 Tauri . . . . .	6.0	4 17 50.753	+0.0010	24 3 47.24	-0.028
95 Tauri . . . . .	6.3	4 37 3.199	+0.0007	23 53 43.66	-0.026
99 Tauri . . . . .	6.0	4 51 37.263	-0.0005	23 47 20.40	-0.026
♊ Tauri . . . . .	6.0	4 51 54.873	+0.0027	24 53 33.43	-0.062
103 Tauri . . . . .	6.0	5 1 53.640	-0.0006	+24 7 48.78	-0.011
118 Tauri . . . . .	5.7	5 22 59.856	+0.0011	25 4 4.00	-0.030
121 Tauri . . . . .	6.0	5 29 13.342	+0.0002	+23 58 17.29	-0.031

MEAN PLACES FOR 1898.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.382, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	" ' "	"
125 Tauri . . . . .	6.0	5 33 24.852	+0.0004	+25 50 23.25	-0.031
132 Tauri . . . . .	5.3	5 42 45.344	-0.0006	24 31 59.63	-0.021
139 Tauri . . . . .	5.3	5 51 39.912	-0.0004	25 56 28.11	-0.002
1 Geminorum . . . . .	5.0	5 57 55.204	0.0000	23 16 7.68	-0.102
2 Geminorum . . . . .	7.2	6 0 35.595	+0.0004	23 38 51.82	-0.015
3 Geminorum . . . . .	6.3	6 3 32.283	-0.0001	+23 7 47.28	-0.014
4 Geminorum . . . . .	7.4	6 4 18.764	-0.0005	23 0 51.04	-0.064
5 Geminorum . . . . .	6.7	6 5 16.965	-0.0004	24 26 32.39	-0.064
8 Geminorum . . . . .	6.5	6 10 5.150	-0.0021	24 0 8.89	-0.039
9 Geminorum . . . . .	6.3	6 10 45.339	-0.0007	23 46 30.02	-0.011
10 Geminorum . . . . .	7.0	6 12 41.425	-0.0018	+23 38 26.63	-0.063
11 Geminorum . . . . .	7.3	6 13 6.840	+0.0009	23 30 34.80	+0.006
<i>d</i> Geminorum . . . . .	6.0	6 45 26.316	-0.0007	21 52 52.26	-0.049
37 Geminorum . . . . .	6.3	6 49 2.421	-0.0029	25 30 10.22	-0.001
<i>w</i> Geminorum . . . . .	5.7	6 56 11.940	-0.0011	24 21 38.06	-0.021
44 Geminorum . . . . .	6.0	6 59 10.009	-0.0004	+22 47 24.29	-0.016
48 Geminorum . . . . .	6.0	7 6 14.625	-0.0012	24 17 56.72	-0.048
56 Geminorum . . . . .	5.7	7 15 55.775	-0.0048	20 38 10.02	-0.021
58 Geminorum . . . . .	6.3	7 17 20.443	-0.0030	23 8 29.84	-0.045
61 Geminorum . . . . .	6.0	7 20 55.637	-0.0013	20 27 39.95	-0.025
63 Geminorum . . . . .	5.7	7 21 41.167	-0.0038	+21 39 13.30	-0.120
79 Geminorum . . . . .	6.3	7 39 9.970	-0.0040	20 33 40.39	+0.010
85 Geminorum . . . . .	6.0	7 49 42.754	-0.0021	20 9 12.09	-0.034
B. A. C. 2658 . . . . .	7.2	7 54 48.411	0.0000	18 31 30.72	+0.003
<i>d</i> <sup>1</sup> Cancri . . . . .	6.0	8 17 31.433	-0.0048	18 39 34.84	-0.253
B. A. C. 2810 . . . . .	7.0	8 18 57.090	-0.0006	+17 30 54.38	-0.122
<i>d</i> <sup>2</sup> Cancri . . . . .	6.0	8 20 3.482	-0.0140	17 22 56.51	-0.147
<i>θ</i> Cancri . . . . .	5.7	8 25 46.831	-0.0050	18 26 20.33	-0.068
<i>δ</i> Cancri . . . . .	4.0	8 38 53.352	-0.0014	18 31 44.92	-0.233
54 Cancri . . . . .	6.3	8 45 20.619	-0.0090	15 43 43.03	+0.061
<i>o</i> <sup>1</sup> Cancri . . . . .	5.7	8 51 33.683	+0.0042	+15 42 50.13	+0.018
<i>o</i> <sup>2</sup> Cancri . . . . .	4.0	8 51 53.444	+0.0032	16 58 22.30	+0.022
<i>π</i> <sup>1</sup> Cancri . . . . .	6.3	9 6 42.661	-0.0375	15 24 24.56	+0.216
<i>π</i> <sup>2</sup> Cancri . . . . .	6.0	9 9 36.072	-0.0024	15 21 53.04	+0.002
<i>ξ</i> Leonis . . . . .	5.3	9 26 26.894	-0.0073	11 45 5.27	-0.082
18 Leonis . . . . .	6.0	9 40 53.716	-0.0010	+12 16 46.80	+0.003
19 Leonis . . . . .	7.0	9 41 56.888	-0.0057	12 2 24.82	+0.148
10 Sextantis . . . . .	6.0	9 51 1.559	-0.0070	9 24 58.62	+0.010
11 Sextantis . . . . .	6.0	9 52 48.430	+0.0003	8 48 2.95	-0.032
16 Sextantis . . . . .	6.9	10 3 54.261	+0.0006	6 40 14.69	-0.013
43 Leonis . . . . .	6.5	10 17 40.254	-0.0020	+ 7 3 36.94	-0.111
34 Sextantis . . . . .	6.7	10 37 21.454	-0.0069	4 6 57.10	+0.016
35 <sup>1</sup> Sextantis . . . . .	6.2	10 38 2.492	-0.0045	5 16 53.03	-0.067
36 Sextantis . . . . .	6.6	10 39 54.126	-0.0041	3 1 27.96	-0.016
55 Leonis . . . . .	6.2	10 50 27.555	+0.0065	1 16 50.05	-0.014
<i>ρ</i> <sup>2</sup> Leonis . . . . .	5.4	10 58 23.263	-0.0059	+ 0 32 53.52	-0.013
<i>ρ</i> <sup>3</sup> Leonis . . . . .	6.9	11 1 41.937	-0.0279	2 30 33.08	-0.086
<i>ρ</i> <sup>5</sup> Leonis . . . . .	5.7	11 8 32.337	-0.0026	+ 0 29 7.04	-0.012

MEAN PLACES FOR 1898.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.382, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ' "	"
<i>ε</i> Leonis . . . . .	5.3	11 25 6.176	+0.0009	- 2 26 26.63	-0.013
B. A. C. 4006 . . . . .	6.1	11 45 49.506	+0.0029	4 45 58.98	-0.022
<i>γ</i> Virginis . . . . .	5.7	12 28 30.788	-0.0070	8 53 22.78	-0.014
69 Virginis . . . . .	5.0	13 22 0.596	-0.0096	15 26 42.48	-0.002
75 Virginis . . . . .	6.0	13 27 24.689	-0.0029	14 50 18.32	-0.012
83 Virginis . . . . .	6.0	13 38 59.595	+0.0006	-15 39 59.24	-0.031
85 Virginis . . . . .	6.5	13 40 5.394	-0.0051	15 15 18.17	-0.043
87 Virginis . . . . .	5.8	13 41 52.371	+0.0021	17 20 57.12	-0.048
89 Virginis . . . . .	5.4	13 44 19.689	-0.0079	17 37 34.57	-0.051
B. A. C. 4722 . . . . .	5.8	14 9 46.793	-0.0027	17 43 29.72	-0.015
42 Libræ . . . . .	5.7	15 34 15.010	-0.0022	-23 29 11.52	-0.033
<i>δ</i> Scorpii . . . . .	5.3	15 44 50.424	-0.0053	25 26 29.39	-0.061
A <sup>3</sup> Scorpii . . . . .	5.2	15 47 29.133	-0.0037	25 1 21.98	-0.039
B. A. C. 5253 . . . . .	5.8	15 47 48.239	-0.0023	24 13 44.70	-0.030
B. A. C. 5254 . . . . .	5.8	15 47 51.508	-0.0031	23 40 26.31	-0.017
3 Scorpii . . . . .	6.7	15 48 32.036	-0.0023	-24 56 27.97	-0.028
<i>π</i> Scorpii . . . . .	3.4	15 52 40.797	-0.0019	25 49 13.33	-0.045
B. A. C. 5314 . . . . .	5.7	15 57 10.750	-0.0032	25 34 49.87	-0.028
B. A. C. 5347 . . . . .	6.0	16 1 54.566	+0.0079	26 3 7.97	+0.114
19 Scorpii . . . . .	5.1	16 14 29.801	-0.0023	23 55 26.46	-0.064
<i>σ</i> Scorpii . . . . .	3.4	16 14 59.198	-0.0022	-25 20 52.57	-0.026
<i>ρ</i> Ophiuchi (South Star) .	5.0	16 19 28.043	-0.0017	23 12 43.85	-0.042
22 Scorpii . . . . .	5.5	16 24 0.568	-0.0011	24 53 26.89	-0.038
25 Scorpii . . . . .	7.0	16 40 36.646	-0.0004	25 20 33.04	-0.004
18 Ophiuchi . . . . .	6.7	16 43 31.823	-0.0027	24 37 42.76	-0.044
B. A. C. 5709 . . . . .	6.3	16 53 43.010	+0.0007	-24 56 12.32	+0.011
26 Ophiuchi . . . . .	6.1	16 53 54.511	+0.0015	24 50 0.56	-0.007
31 Ophiuchi . . . . .	6.7	16 58 27.026	+0.0001	25 29 58.53	-0.008
B. A. C. 5800 . . . . .	7.5	17 7 53.055	-0.0020	26 51 45.08	-0.104
A Ophiuchi . . . . .	4.9	17 9 4.553	-0.0364	26 27 9.93	-1.156
B. A. C. 5813 . . . . .	6.8	17 9 57.054	-0.0360	-26 23 59.55	-1.158
38 Ophiuchi . . . . .	6.7	17 11 18.846	-0.0062	26 31 0.92	-0.074
39 Ophiuchi (South Star) .	6.0	17 11 47.347	-0.0060	24 10 33.62	-0.035
B. A. C. 5831 . . . . .	6.9	17 11 53.317	+0.0073	23 57 37.95	-0.104
B. A. C. 5846 . . . . .	6.8	17 15 26.103	-0.0055	24 48 10.70	-0.040
B. A. C. 5868 . . . . .	7.0	17 18 52.148	+0.0008	-24 9 1.05	-0.007
C <sup>2</sup> Ophiuchi . . . . .	5.2	17 25 11.492	-0.0011	23 53 1.46	-0.036
63 Ophiuchi . . . . .	6.6	17 48 37.433	-0.0004	24 51 59.25	+0.002
B. A. C. 6066 . . . . .	7.3	17 50 53.477	-0.0001	23 55 28.56	-0.022
4 Sagittarii . . . . .	5.4	17 53 33.924	-0.0006	23 48 24.24	-0.066
5 Sagittarii . . . . .	7.0	17 53 56.416	+0.0031	-24 16 32.89	-0.035
7 Sagittarii . . . . .	5.9	17 56 36.045	-0.0018	24 16 52.41	-0.013
9 Sagittarii . . . . .	6.0	17 57 37.123	-0.0020	24 21 46.29	-0.026
B. A. C. 6161 . . . . .	5.7	18 5 29.873	+0.0003	23 43 20.97	-0.070
B. A. C. 6304 . . . . .	7.0	18 27 0.223	-0.0014	24 11 2.07	-0.021
24 Sagittarii . . . . .	5.9	18 27 39.618	-0.0012	-24 6 28.67	-0.009
25 Sagittarii . . . . .	6.3	18 28 18.664	+0.0049	24 17 58.73	+0.009
B. A. C. 6343 . . . . .	6.3	18 32 18.479	-0.0014	-23 35 30.92	-0.033

MEAN PLACES FOR 1898.0. (January 0<sup>d</sup>.0—0<sup>d</sup>.382, Washington.)

Name of Star.	Magni- tude.	Right Ascension.	Annual Proper Motion.	Declination.	Annual Proper Motion.
		h m s	s	° ' "	"
26 Sagittarii . . . . .	6.6	18 35 38.330	+0.0012	-23 55 41.97	-0.030
B. A. C. 6369 . . . . .	6.2	18 38 33.345	-0.0011	25 6 45.97	-0.030
28 Sagittarii . . . . .	5.6	18 40 11.499	+0.0006	22 29 57.23	-0.022
30 Sagittarii . . . . .	6.6	18 44 42.551	-0.0050	22 16 44.43	-0.038
31 Sagittarii . . . . .	7.0	18 46 0.720	-0.0003	22 2 27.82	-0.044
ν <sup>1</sup> Sagittarii . . . . .	5.0	18 48 0.620	-0.0019	-22 52 13.34	-0.031
ν <sup>2</sup> Sagittarii . . . . .	5.1	18 48 57.159	+0.0062	22 47 54.81	-0.025
B. A. C. 6448 . . . . .	6.4	18 49 50.153	-0.0003	23 18 12.19	-0.018
θ Sagittarii . . . . .	3.8	18 58 34.260	+0.0041	21 53 27.17	-0.073
π Sagittarii . . . . .	3.1	19 3 41.899	-0.0014	21 11 8.61	-0.044
B. A. C. 6607 . . . . .	5.9	19 14 31.481	-0.0009	-22 35 33.39	-0.020
χ <sup>3</sup> Sagittarii . . . . .	5.6	19 19 19.268	-0.0025	24 9 43.62	-0.017
50 Sagittarii . . . . .	5.9	19 20 14.127	+0.0004	21 58 42.84	-0.009
f Sagittarii . . . . .	5.2	19 40 24.738	-0.0106	20 0 22.78	-0.096
57 Sagittarii . . . . .	6.1	19 46 16.455	+0.0004	19 18 14.59	-0.066
σ Capricorni . . . . .	5.6	20 13 30.533	-0.0004	-19 26 12.62	-0.008
ρ Capricorni . . . . .	5.3	20 23 2.613	-0.0013	18 9 2.95	-0.020
B. A. C. 7044 . . . . .	7.0	20 23 11.131	+0.0007	18 12 37.21	-0.148
ο Capricorni . . . . .	6.2	20 24 3.074	0.0000	18 55 14.70	-0.083
τ <sup>1</sup> Capricorni . . . . .	7.0	20 31 38.144	+0.0052	15 30 2.18	-0.040
τ <sup>2</sup> Capricorni . . . . .	5.6	20 33 34.197	+0.0001	-15 18 45.44	-0.029
υ Capricorni . . . . .	5.7	20 34 14.646	-0.0021	18 29 51.11	-0.002
B. A. C. 7263 . . . . .	5.9	20 51 58.016	+0.0046	16 25 27.87	-0.029
8 Aquarii . . . . .	6.8	20 54 18.528	-0.0030	13 26 49.95	-0.012
9 Aquarii . . . . .	6.8	20 55 31.065	-0.0017	13 55 44.90	-0.013
29 Capricorni . . . . .	5.7	21 10 6.186	+0.0016	-15 35 43.21	-0.003
18 Aquarii . . . . .	5.7	21 18 37.183	+0.0061	13 18 57.55	-0.008
B. A. C. 7562 . . . . .	5.5	21 39 28.962	+0.0047	9 30 19.86	0.000
C <sup>1</sup> Capricorni . . . . .	5.5	21 39 33.939	-0.0005	9 33 3.37	-0.005
C <sup>2</sup> Capricorni . . . . .	6.4	21 40 49.740	-0.0008	9 44 48.63	-0.007
λ Capricorni . . . . .	5.7	21 41 2.705	+0.0009	-11 50 11.63	-0.022
50 Capricorni . . . . .	6.9	21 41 12.219	+0.0009	12 9 55.15	-0.141
B. A. C. 7620 . . . . .	6.5	21 48 9.2..	. . . . .	10 47 32.82	-0.067
30 Aquarii . . . . .	5.8	21 57 54.531	+0.0015	7 0 55.38	+0.001
36 Aquarii . . . . .	6.3	22 4 3.240	+0.0021	8 41 13.81	+0.045
44 Aquarii . . . . .	6.4	22 11 46.972	-0.0014	- 5 53 47.02	+0.031
ρ Aquarii . . . . .	5.6	22 14 49.964	+0.0006	8 19 59.80	-0.007
51 Aquarii . . . . .	5.8	22 18 48.119	+0.0012	5 21 11.95	-0.002
κ Aquarii . . . . .	5.2	22 32 28.499	-0.0051	4 45 15.01	-0.122
B. A. C. 7951 (mean) . . . . .	6.7	22 42 34.499	-0.0150	4 45 28.69	-0.286
3 Piscium . . . . .	6.4	22 55 23.836	-0.0031	- 0 21 41.09	+0.021
κ Piscium . . . . .	4.7	23 21 42.194	+0.0046	+ 0 41 49.02	-0.111
9 Piscium . . . . .	6.6	23 22 1.336	+0.0032	0 33 42.73	-0.051
15 Piscium . . . . .	6.6	23 30 15.531	-0.0077	0 44 58.19	-0.041
16 Piscium . . . . .	5.8	23 31 10.977	-0.0080	1 32 10.13	+0.056
λ Piscium . . . . .	4.5	23 36 50.504	-0.0098	+ 1 13 6.57	-0.172
19 Piscium . . . . .	4.9	23 41 10.743	-0.0039	2 55 15.01	-0.032
22 Piscium . . . . .	5.0	23 46 44.463	-0.0008	+ 2 21 47.89	-0.020

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	"	°	d h m	h m				°	'
15 Arietis	5.7	+1.46	+12.0	+19 1.3	1 5 9.7	- 2 9.0	-0.8754	0.5184	+0.1806	- 7	-71
B. A. C. 686	7.2	1.48	12.0	19 8.4	6 47.3	- 0 34.3	-0.7135	0.5191	0.1783	+ 3	-71
$\theta$ Arietis	5.7	1.51	12.0	19 26.0	8 55.4	+ 1 30.0	-0.6587	0.5196	0.1750	+ 6	-69
23 Arietis	7.5	1.52	12.0	19 13.5	9 26.1	+ 1 59.7	-0.3493	0.5201	0.1743	+24	-51
26 Arietis	6.0	1.59	11.9	19 24.3	15 9.0	+ 7 32.1	+0.4307	0.5223	0.1655	+69	- 9
$\nu$ Arietis	5.7	+1.65	+12.4	+21 31.4	19 9.9	+11 25.5	-1.2571	0.5239	+0.1590	-41	-68
$\mu$ Arietis	6.0	1.66	11.7	19 34.8	20 56.2	-10 51.5	+1.1707	0.5246	0.1561	+90	+39
$\epsilon$ Arietis	4.6	1.77	11.7	20 56.1	2 5 8.9	- 2 54.3	+0.8970	0.5281	0.1420	+90	+20
66 Arietis	6.0	1.95	11.4	22 27.3	19 9.9	+10 39.9	+1.0259	0.5340	0.1160	+90	+32
7 Tauri	6.0	1.99	11.7	24 7.5	21 59.0	-10 36.4	-0.5074	0.5351	0.1105	+14	-54
9 Tauri	7.0	+2.03	+11.2	+22 52.6	23 12.0	- 9 25.8	+1.0113	0.5356	+0.1082	+90	+32
11 Tauri	6.7	2.06	11.6	24 0.2	3 0 57.5	- 7 43.6	-1.1616	0.5363	0.1045	-33	-65
$\gamma$ Pleiadum	6.3	2.07	11.2	23 58.3	2 52.5	- 5 52.3	+0.1796	0.5371	0.1007	+53	-15
17 Tauri	4.3	2.07	11.2	23 47.7	2 54.7	- 5 50.2	+0.3787	0.5371	0.1006	+66	- 5
18 Tauri	6.3	2.08	11.3	24 31.3	3 2.1	- 5 43.1	-0.4154	0.5371	0.1003	+19	-47
19 Tauri	5.0	+2.08	+11.2	+24 9.0	3 3.7	- 5 41.5	+0.0001	0.5372	+0.1003	+42	-24
20 Tauri	5.0	2.08	11.2	24 3.1	3 21.3	- 5 24.5	+0.1388	0.5373	0.0997	+50	-17
21 Tauri	7.0	2.08	11.2	24 14.3	3 23.3	- 5 22.5	-0.0658	0.5373	0.0996	+37	-27
22 Tauri	7.0	2.08	11.2	24 12.7	3 27.3	- 5 18.7	-0.0296	0.5373	0.0995	+40	-25
23 Tauri	4.7	2.08	11.1	23 38.0	3 35.8	- 5 10.5	+0.6270	0.5374	0.0992	+88	+ 9
$\eta$ Tauri	3.1	+2.08	+11.1	+23 47.6	4 8.3	- 4 39.0	+0.5037	0.5374	+0.0981	+76	+ 2
26 Tauri	7.0	2.08	10.9	23 32.8	4 49.7	- 3 59.0	+0.8433	0.5378	0.0966	+90	+22
27 Tauri	4.0	2.08	11.0	23 44.7	4 55.6	- 3 53.3	+0.6340	0.5379	0.0965	+89	+ 9
28 Tauri	6.2	2.08	11.0	23 49.7	4 56.2	- 3 52.7	+0.5424	0.5379	0.0964	+80	+ 5
36 Tauri	6.0	2.17	10.4	23 49.7	12 1.6	+ 2 58.7	+1.1743	0.5405	0.0816	+90	+48
$\rho$ Tauri	6.0	+2.24	+10.6	+26 13.1	14 59.1	+ 5 50.4	-1.2482	0.5415	+0.0753	-47	-64
$\chi$ Tauri	5.7	2.28	9.9	25 23.5	20 25.8	+11 6.2	+0.0475	0.5432	+0.0634	+45	-18
125 Tauri	6.0	2.61	5.6	25 50.5	5 7 33.8	- 2 57.2	+0.3727	0.5492	-0.0172	+66	+ 4
139 Tauri	5.3	2.66	4.5	25 56.5	15 50.1	+ 5 2.2	+0.0381	0.5491	0.0365	+44	-16
$\epsilon$ Geminorum	3.2	2.75	1.3	25 13.9	12 47.2	+ 1 16.8	-0.4442	0.5462	0.0841	+17	-47
37 Geminorum	6.3	+2.77	+ 0.6	+25 30.2	18 1.2	+ 6 20.4	-1.2120	0.5449	-0.0955	-40	-64
$\omega$ Geminorum	5.7	2.75	+ 0.1	24 21.6	21 19.5	+ 9 32.0	-0.2793	0.5440	0.1026	+26	-39
48 Geminorum	6.0	2.76	- 0.6	24 17.9	7 1 58.8	- 9 58.0	-0.7112	0.5427	0.1124	+ 2	-65
$\delta$ Geminorum	3.5	2.72	1.1	22 10.2	5 36.3	- 6 27.7	+1.2115	0.5417	0.1108	+90	+48
58 Geminorum	6.3	2.74	1.3	23 8.5	7 9.0	- 4 58.0	-0.0459	0.5410	0.1229	+40	-28
85 Geminorum	6.0	+2.66	- 3.5	+20 9.1	22 25.9	+ 9 49.0	+1.1243	0.5356	-0.1521	+90	+35
$\delta$ Cancri	6.0	2.60	5.1	18 39.5	8 11 49.2	- 1 13.3	+0.5681	0.5304	0.1750	+80	- 3
$\theta$ Cancri	5.7	2.58	5.6	18 26.2	15 50.6	+ 2 40.5	+0.0918	0.5289	0.1813	+47	-28
$\delta$ Cancri	4.0	2.55	6.5	18 31.6	22 16.9	+ 8 54.8	-1.2039	0.5264	0.1909	-32	-71
54 Cancri	6.3	2.49	6.5	15 43.6	9 1 28.3	-11 59.7	+1.2270	0.5252	0.1955	+90	+39
$\alpha$ Cancri	5.7	+2.48	- 6.8	+15 42.7	4 33.5	- 9 0.4	+0.6264	0.5242	-0.1997	+85	- 3
$\alpha$ Cancri	6.0	2.49	6.9	15 58.3	4 43.3	- 8 50.8	+0.3184	0.5240	0.1999	+61	-19
$\pi$ Cancri	6.3	2.48	7.6	15 24.3	12 7.9	- 1 39.8	-0.5835	0.5215	0.2093	+11	-70
$\pi$ Cancri	6.0	2.43	7.8	15 21.8	13 35.0	- 0 15.4	-0.8427	0.5210	0.2111	- 4	-75
$\xi$ Leonis	5.3	2.34	8.1	11 45.0	22 6.1	+ 8 0.3	+1.2266	0.5183	0.2206	+90	+35
18 Leonis	6.0	+2.28	- 8.8	+12 16.6	10 5 28.1	- 8 50.9	-0.9962	0.5163	-0.2279	-12	-78
19 Leonis	7.0	2.29	8.8	12 2.3	6 0.4	- 8 19.5	-0.8609	0.5162	0.2284	- 4	-78
10 Sextantis	6.0	2.23	8.8	9 24.8	10 39.7	- 3 48.5	+0.8915	0.5152	0.2325	+90	+ 8
11 Sextantis	6.0	2.21	8.7	8 47.9	11 32.0	- 2 57.8	+1.3498	0.5146	0.2333	+90	+48
$\pi$ Leonis	5.0	2.20	8.8	8 31.9	12 36.8	- 1 54.7	+1.3843	0.5146	0.2342	+90	+55
43 Leonis	6.5	+2.11	- 9.4	+ 7 3.5	11 0 24.5	+ 9 31.8	+0.1483	0.5129	-0.2425	+50	-33
34 Sextantis	6.7	2.00	9.5	4 6.8	10 36.5	- 4 34.3	+0.7895	0.5123	0.2479	+90	0
35 <sup>1</sup> Sextantis	6.2	2.00	9.8	5 16.7	10 57.8	- 4 13.5	-0.5411	0.5123	0.2481	+14	-74
$\rho$ Leonis	6.2	1.88	9.9	2 30.4	23 12.9	+ 7 39.9	-0.6565	0.5128	0.2521	+ 8	-85
$\rho$ Leonis	5.7	1.84	9.5	+ 0 29.0	12 2 44.8	+11 5.6	+0.5973	0.5132	0.2528	+80	-11
B. A. C. 4006	6.1	+1.65	- 8.6	- 4 46.1	21 49.7	+ 5 36.3	+1.2963	0.5176	-0.2527	+85	+37



## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JANUARY.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		$\alpha$	$\delta$	$\alpha$	d h m	h m				$\alpha$	$\delta$
9 Virginis	5.7	+1.44	-8.0	- 8 53.5	13 19 4.7	+ 2 12.1	+0.3010	0.5270	-0.2445	+57	-26
69 Virginis	5.0	1.17	6.2	15 26.8	14 20 23.8	+ 2 41.9	+1.1333	0.5440	0.2222	+75	+24
75 Virginis	6.0	1.15	6.5	14 50.4	22 51.6	+ 5 4.7	-0.0343	0.5446	0.2192	+34	-44
83 Virginis	6.0	1.08	6.1	15 40.1	15 4 5.0	+10 7.4	-0.3123	0.5502	0.2124	+19	-60
85 Virginis	6.5	1.08	6.3	15 15.4	4 34.4	+10 35.8	-0.8373	0.5506	0.2117	-10	-90
87 Virginis	5.8	+1.07	-5.6	-17 21.0	5 22.1	+11 21.8	+1.1358	0.5513	-0.2106	+73	+25
89 Virginis	5.4	1.05	5.5	17 37.7	6 27.6	-11 34.9	+1.1925	0.5522	0.2090	+72	+30
B. A. C. 4722	5.8	0.93	5.6	17 43.6	17 34.2	- 0 52.0	-0.9352	0.5620	0.1914	-18	-90
42 Libræ	5.7	0.56	3.9	23 29.3	17 3 54.6	+ 8 9.5	-0.4683	0.5923	0.1157	0	-72
6 Scorpii	5.3	0.51	3.3	25 26.6	7 59.1	-11 55.8	+1.0410	0.5954	0.1047	+65	+22
A <sup>3</sup> Scorpii	5.2	+0.50	-3.4	-25 1.4	8 59.8	-10 57.6	+0.5169	0.5962	-0.1019	+52	-13
B. A. C. 5253	5.8	0.50	3.7	24 13.8	9 7.1	-10 50.6	-0.2899	0.5963	0.1016	+ 8	-60
B. A. C. 5254	5.8	0.50	3.9	23 40.5	9 8.4	-10 49.4	-0.8477	0.5963	0.1015	-22	-90
3 Scorpii	6.7	0.50	3.5	24 56.5	9 23.8	-10 34.6	+0.3933	0.5964	0.1008	+45	-20
$\pi$ Scorpii	3.4	0.48	3.2	25 49.3	10 58.6	- 9 3.7	+1.1180	0.5976	0.0964	+64	+29
B. A. C. 5314	5.7	+0.47	-3.3	-25 34.9	12 41.0	- 7 25.5	+1.7206	0.5988	-0.0915	+64	- 1
B. A. C. 5347	6.0	0.45	3.2	26 3.2	14 28.3	- 5 42.6	+1.0291	0.6000	0.0863	+64	+21
$\sigma$ Scorpii	3.4	0.41	3.4	25 20.9	19 22.7	- 1 0.5	-0.0630	0.6032	0.0719	+17	-46
$\alpha$ Scorpii	1.2	0.37	3.2	26 12.4	22 25.2	+ 1 54.3	+0.5873	0.6049	0.0627	+54	- 9
22 Scorpii	5.5	0.37	3.5	24 53.5	22 44.3	+ 2 12.6	-0.7427	0.6050	0.0618	-19	-90
B. A. C. 5709	6.3	+0.27	-3.6	-24 56.3	18 9 40.7	-11 18.9	-1.1833	0.6098	-0.0274	-54	-90
31 Ophiuchi	6.7	0.26	3.4	25 30.0	11 24.5	- 9 39.5	-0.6665	0.6103	0.0219	-19	-90
B. A. C. 5800	7.5	0.23	3.1	26 51.8	14 50.8	- 6 22.2	+0.6304	0.6112	0.0108	+54	- 6
A Ophiuchi	4.9	0.23	3.2	26 27.2	15 16.9	- 5 57.2	+0.2175	0.6113	0.0094	+27	-30
B. A. C. 5813	6.8	0.22	3.2	26 24.0	15 36.0	- 5 38.9	+0.1639	0.6114	0.0084	+24	-33
38 Ophiuchi	6.7	+0.22	-3.2	-26 31.1	16 5.7	- 5 10.5	+0.2763	0.6115	-0.0068	+30	-26
$\lambda$ Sagittarii	2.9	0.07	3.4	25 28.8	19 17 42.3	- 4 10.1	+0.1351	0.6096	+0.0755	+28	-33
B. A. C. 6304	7.0	0.06	3.6	24 11.1	19 39.7	- 2 47.7	-0.9921	0.6089	0.0816	-34	-90
24 Sagittarii	5.9	0.06	3.6	24 6.5	19 54.2	- 2 33.8	-1.0474	0.6088	0.0823	-38	-90
25 Sagittarii	6.3	0.06	3.6	24 18.0	20 8.5	- 2 20.1	-0.8380	0.6087	0.0831	-24	-90
26 Sagittarii	6.6	+0.04	-3.7	-23 55.8	22 20.5	+ 0 15.1	-0.9703	0.6076	+0.0913	-32	-90
MARS				23 28.5	20 8 45.3	+ 9 44.8	-0.3669	0.5713	0.1173	+ 6	-65
B. A. C. 6607	5.9	0.00	3.7	22 35.6	20 13 23.4	- 9 48.5	-0.5285	0.6001	0.1341	- 1	-78
NEW MOON.											
$\lambda$ Capricorni	5.7	+0.08	-1.8	-11 50.2	23 1 49.4	+ 0 20.9	+0.4969	0.5495	+0.2426	+67	-16
50 Capricorni	6.9	0.08	1.8	12 9.9	1 53.7	+ 0 25.0	+0.8472	0.5495	0.2427	+78	+ 4
36 Aquarii	6.3	0.12	0.9	8 41.2	12 21.8	+10 31.9	-0.0983	0.5416	0.2506	+35	-47
$\theta$ Aquarii	4.4	0.14	0.7	8 17.5	15 48.9	-10 7.8	+0.3667	0.5393	0.2525	+61	-23
$\rho$ Aquarii	5.6	0.15	-0.7	8 20.0	17 24.2	- 8 35.5	+0.8119	0.5382	0.2533	+81	+ 1
$\kappa$ Aquarii	5.2	+0.17	+0.3	- 4 45.2	24 1 47.0	- 0 29.0	-0.7159	0.5329	+0.2566	+ 4	-90
B. A. C. 7951 (mean.)	6.7	0.21	0.6	- 4 45.5	6 39.1	+ 4 13.8	+0.5396	0.5301	0.2577	+75	-14
$\kappa$ Piscium	4.7	0.32	2.6	+ 0 41.9	25 1 55.6	- 1 5.7	-0.1396	0.5214	0.2569	+35	-50
9 Piscium	6.6	0.32	2.6	0 33.8	2 5.2	- 0 56.4	+0.0424	0.5214	0.2569	+44	-40
15 Piscium	6.6	0.36	2.8	0 45.0	6 13.0	+ 3 3.8	+0.9064	0.5200	0.2557	+90	+ 6
16 Piscium	5.8	+0.35	+3.2	+ 1 32.1	6 40.9	+ 3 30.9	+0.2026	0.5198	+0.2556	+54	-31
$\lambda$ Piscium	4.5	0.38	3.2	1 13.2	9 31.9	+ 6 16.8	+1.2635	0.5189	0.2546	+90	+33
19 Piscium	4.9	0.39	3.8	2 55.3	11 43.3	+ 8 24.1	+0.0358	0.5184	0.2537	+44	-40
22 Piscium	5.0	0.42	3.6	2 21.9	14 32.2	+11 8.0	+1.3352	0.5177	0.2525	+90	+42
36 Piscium	6.3	0.50	5.6	7 40.5	26 3 2.8	- 0 44.0	-1.1531	0.5154	0.2453	-24	-82
$\alpha$ Piscium	5.3	+0.52	+5.7	+ 7 37.5	5 6.2	+ 1 15.7	-0.5981	0.5147	+0.2433	+11	-77
45 Piscium	6.9	0.55	5.6	7 7.7	7 42.2	+ 3 47.1	+0.5604	0.5150	0.2419	+77	-12
75 Piscium	6.0	0.75	8.0	12 24.7	27 4 32.6	+ 0 0.1	-0.2285	0.5153	0.2230	+30	-51
$\eta$ Piscium	3.7	0.88	9.0	14 49.3	17 10.0	-11 45.2	-0.1059	0.5170	0.2084	+36	-41
101 Piscium	6.3	0.91	8.9	14 8.5	19 20.4	- 9 38.7	+1.0815	0.5174	0.2057	+90	+25
103 Piscium	6.8	+0.93	+9.6	+16 6.6	21 4.6	- 7 57.7	-0.6971	0.5177	+0.2035	+ 5	-74

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## JANUARY.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.		
		$\Delta\alpha$	$\Delta\delta$										
		<i>s</i>	<i>"</i>									<i>°</i>	<i>d</i>
105 Piscium	6.3	+0.94	+ 9.5	+15 53.5	27 21 17.3	- 7 45.4	-0.4160	0.5178	+0.2032	+20	-59		
3 Arietis	6.0	0.98	9.9	16 54.3	28 0 45.2	- 4 23.8	-0.8209	0.5185	0.1986	- 2	-73		
4 Arietis	5.7	0.99	9.7	16 27.0	1 33.4	- 3 37.0	-0.1689	0.5187	0.1975	+33	-44		
4 Arietis	5.7	1.04	10.0	17 19.3	6 8.3	+ 0 49.4	-0.2272	0.5199	0.1911	+30	-46		
15 Arietis	5.7	1.12	10.6	19 1.3	12 43.3	+ 7 12.3	-0.8554	0.5216	0.1815	- 6	-71		
B. A. C. 686	7.2	+1.15	+10.6	+19 8.4	14 19.5	+ 8 45.6	-0.6954	0.5221	+0.1791	+ 4	-71		
θ Arietis	5.7	1.17	10.7	19 25.9	16 25.9	+10 48.0	-0.6420	0.5227	0.1758	+ 7	-68		
23 Arietis	7.5	1.18	10.6	19 13.4	16 56.3	+11 17.5	-0.3253	0.5229	0.1750	+24	-50		
26 Arietis	6.0	1.25	10.6	19 24.3	22 35.0	- 7 14.3	+0.4387	0.5245	0.1660	+70	- 9		
ν Arietis	5.7	1.31	11.4	21 31.4	29 2 33.4	- 3 23.3	-1.2389	0.5259	0.1594	-39	-68		
μ Arietis	6.0	+1.33	+10.1	+19 34.8	4 18.6	- 1 41.4	+1.1725	0.5265	+0.1564	+90	+39		
ε Arietis	4.6	1.45	10.9	20 56.1	12 27.1	+ 6 11.6	+0.9001	0.5292	0.1421	+90	+20		
66 Arietis	6.0	1.65	10.9	22 27.3	30 2 23.1	- 4 19.2	+1.0268	0.5340	0.1158	+90	+32		
7 Tauri	6.0	1.70	11.3	24 7.5	5 11.5	- 1 36.2	-0.5006	0.5349	0.1103	+14	-53		
9 Tauri	7.0	1.73	10.7	22 52.6	6 24.3	- 0 25.8	+1.0091	0.5354	0.1078	+90	+31		
11 Tauri	6.7	+1.77	+11.3	+25 0.2	8 9.4	+ 1 15.8	-1.1527	0.5360	+0.1046	-32	-65		
g Pleiadum	6.3	1.79	10.8	23 58.3	10 4.1	+ 3 6.9	+0.1830	0.5365	0.1002	+53	-15		
17 Tauri	4.3	1.79	10.8	23 47.7	10 6.3	+ 3 9.0	+0.3811	0.5365	0.1002	+66	- 4		
18 Tauri	6.3	1.80	11.0	24 31.3	10 13.7	+ 3 16.1	-0.4101	0.5366	0.1001	+19	-47		
19 Tauri	5.0	1.79	10.9	24 9.0	10 15.3	+ 3 17.7	+0.0042	0.5367	0.1000	+42	-24		
20 Tauri	5.0	+1.79	+10.8	+24 3.1	10 32.8	+ 3 34.5	+0.1419	0.5367	+0.0994	+51	-16		
21 Tauri	7.0	1.80	10.9	24 14.3	10 34.9	+ 3 36.6	-0.0615	0.5367	0.0993	+38	-27		
22 Tauri	7.0	1.80	10.9	24 12.7	10 38.9	+ 3 40.4	-0.0254	0.5367	0.0992	+40	-25		
23 Tauri	4.7	1.79	10.7	23 38.0	10 47.3	+ 3 48.6	+0.6287	0.5368	0.0989	+89	+ 9		
η Tauri	3.1	1.80	10.7	23 47.6	11 19.7	+ 4 20.0	+0.5058	0.5370	0.0978	+76	+ 2		
26 Tauri	7.0	+1.81	+10.6	+23 32.8	12 1.0	+ 4 59.9	+0.8441	0.5372	+0.0964	+90	+22		
27 Tauri	4.0	1.81	10.7	23 44.7	12 6.8	+ 5 5.5	+0.6354	0.5372	0.0962	+90	+ 9		
28 Tauri	6.2	1.82	10.7	23 49.7	12 7.5	+ 5 6.2	+0.5442	0.5372	0.0962	+80	+ 5		
36 Tauri	6.0	1.92	10.2	23 49.7	19 12.1	+11 56.8	+1.1733	0.5394	0.0813	+90	+48		
ρ Tauri	6.0	1.99	10.7	26 13.1	22 9.5	- 9 11.5	-1.2423	0.5403	0.0750	-46	-64		
χ Tauri	5.7	+2.06	+10.0	+25 23.5	31 3 36.1	- 3 55.9	+0.0489	0.5418	+0.0631	+45	-18		

## FEBRUARY.

125 Tauri	6.0	+2.53	+ 6.2	+25 50.5	1 14 47.0	+ 6 3.7	+0.3710	0.5472	-0.0172	+67	+ 4
139 Tauri	5.3	2.62	5.1	25 56.6	23 4.1	- 9 56.1	+0.0371	0.5474	0.0364	+44	-16
ε Geminorum	3.2	2.81	1.9	25 14.0	2 20 2.0	+10 19.2	-0.4431	0.5453	0.0837	+17	-47
37 Geminorum	6.3	2.85	1.2	25 30.1	8 1 15.7	- 8 37.5	-1.2075	0.5444	0.0953	-39	-64
ω Geminorum	5.7	2.85	+ 0.4	24 21.6	4 33.6	- 5 26.3	-0.2773	0.5437	0.1024	+27	-39
48 Geminorum	6.0	+2.88	- 0.3	+24 17.6	9 12.3	- 0 56.8	-0.7072	0.5426	-0.1121	+ 2	-65
δ Geminorum	3.5	2.86	1.2	22 10.2	12 49.2	+ 2 32.9	+1.2100	0.5417	0.1196	+90	+48
58 Geminorum	6.3	2.88	1.2	23 8.5	14 21.7	+ 4 2.4	-0.0422	0.5413	0.1228	+40	-28
85 Geminorum	6.0	2.90	4.0	20 9.2	4 5 34.2	- 5 15.1	+1.1307	0.5370	0.1523	+90	+36
δ <sup>1</sup> Cancri	6.0	2.91	6.0	18 39.5	18 51.6	+ 7 36.7	+0.5751	0.5327	0.1754	+81	- 2
θ Cancri	5.7	+2.91	- 6.6	+18 26.2	22 50.9	+11 28.4	+0.1018	0.5315	-0.1819	+48	-27
δ Cancri	4.0	2.91	7.6	18 31.6	5 13.2	- 6 21.3	-1.1850	0.5294	0.1917	-30	-71
54 Cancri	6.3	2.86	8.2	15 43.6	8 22.6	- 3 17.8	+1.2348	0.5285	0.1963	+90	+40
o <sup>1</sup> Cancri	5.7	2.86	8.5	15 42.7	11 25.7	- 0 20.5	+0.6441	0.5275	0.2006	+87	- 1
o <sup>2</sup> Cancri	6.0	2.87	8.5	15 58.2	11 35.4	- 0 11.1	+0.3317	0.5275	0.2008	+62	-18
π <sup>1</sup> Cancri	6.3	+2.86	- 9.4	+15 24.3	18 54.5	+ 6 54.4	-0.5625	0.5253	-0.2105	+12	-68
π <sup>2</sup> Cancri	6.0	2.86	9.6	15 21.7	20 20.6	+ 8 17.8	-0.8201	0.5249	0.2123	- 3	-75
ξ Leonis	5.3	2.79	10.6	11 44.9	6 4 44.7	- 7 33.5	+1.2413	0.5227	0.2221	+90	+37
18 Leonis	6.0	2.78	11.4	12 16.6	12 0.2	- 0 31.3	-0.9653	0.5211	0.2296	-11	-78
19 Leonis	7.0	2.77	11.4	12 2.2	12 32.0	- 0 0.4	-0.8304	0.5210	0.2301	- 3	-78
10 Sextantis	6.0	+2.73	-11.8	+ 9 24.8	17 7.1	+ 4 26.3	+0.9134	0.5201	-0.2343	+90	+10

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

FEBRUARY.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
11 Sextantis	6.0	+2.72	-11.8	+ 8 47.8	6 17 58.6	+ 5 16.3	+1.3697	0.5199	-0.2350	+90	+52
43 Leonis	6.5	2.66	12.8	7 3.4	7 6 38.9	- 6 26.3	+0.1813	0.5182	0.2445	+52	-31
34 Sextantis	6.7	2.59	13.4	4 6.7	16 41.1	+ 3 17.8	+0.8241	0.5176	0.2500	+90	+ 2
35 <sup>1</sup> Sextantis	6.2	2.60	13.5	5 16.7	17 2.1	+ 3 38.3	-0.4992	0.5176	0.2501	+16	-71
$\rho^3$ Leonis	6.2	2.52	14.0	2 30.3	8 5 5.8	- 8 39.8	-0.6080	0.5179	0.2541	+10	-81
$\rho^6$ Leonis	5.7	+2.49	-13.9	+ 0 28.9	8 34.6	- 5 17.2	+0.6413	0.5183	-0.2548	+84	- 9
B. A. C. 4006	6.1	2.36	13.9	- 4 46.2	9 3 24.7	-11 1.3	+1.3479	0.5218	0.2543	+85	+44
$\eta$ Virginis	5.7	2.21	13.5	8 53.6	10 0 29.1	+ 9 23.9	+0.3651	0.5296	0.2453	+61	-23
69 Virginis	5.0	2.03	11.7	15 26.9	11 1 47.3	+ 9 52.7	+1.2093	0.5437	0.2218	+75	+31
75 Virginis	6.0	2.00	11.9	14 50.5	4 15.8	-11 43.8	+0.0382	0.5454	0.2187	+38	-40
83 Virginis	6.0	+1.96	-11.4	-15 40.2	9 31.2	- 6 39.1	-0.2400	0.5492	-0.2116	+23	-56
85 Virginis	6.5	1.95	11.5	15 15.5	10 0.8	- 6 10.6	-0.7675	0.5493	0.2109	- 5	-90
89 Virginis	5.4	1.94	10.8	17 37.8	11 55.0	- 4 20.2	+1.2728	0.5506	0.2081	+72	+40
B. A. C. 4722	5.8	1.85	10.5	17 43.7	23 8.9	+ 6 30.0	-0.8663	0.5592	0.1901	-14	-90
42 Libræ	5.7	1.51	7.1	23 29.3	18 10 11.5	- 7 46.0	-0.4001	0.5843	0.1142	+ 4	-68
$\delta$ Scorpii	5.3	+1.47	- 6.3	-25 26.6	14 22.8	- 3 44.6	+1.1281	0.5870	-0.1033	+65	+30
A <sup>2</sup> Scorpii	5.2	1.46	6.4	25 1.5	15 25.2	- 2 44.8	+0.5971	0.5876	0.1005	+58	- 8
B. A. C. 5253	5.8	1.46	6.6	24 13.9	15 32.7	- 2 37.5	-0.2203	0.5877	0.1002	+12	-55
B. A. C. 5254	5.8	1.45	6.8	23 40.6	15 34.0	- 2 36.3	-0.7855	0.5877	0.1001	-19	-90
3 Scorpii	6.7	1.46	6.4	24 56.6	15 50.0	- 2 20.9	+0.4730	0.5878	0.0996	+50	-15
$\pi$ Scorpii	3.4	+1.45	- 6.0	-25 49.3	17 27.4	- 0 47.4	+1.2063	0.5888	-0.0950	+64	+39
B. A. C. 5314	5.7	1.44	6.0	25 34.9	19 12.9	+ 0 53.9	+0.8000	0.5808	0.0902	+64	+ 5
B. A. C. 5347	6.0	1.42	5.7	26 3.2	21 3.4	+ 2 40.0	+1.1159	0.5908	0.0851	+64	+29
$\alpha$ Scorpii	3.4	1.35	5.7	25 21.0	14 2 6.9	+ 7 31.2	+0.0074	0.5934	0.0709	+21	-41
$\sigma$ Scorpii	1.2	1.32	5.3	26 12.4	5 15.2	+10 31.9	+0.6665	0.5949	0.0618	+60	- 4
22 Scorpii	5.5	+1.31	- 5.7	-24 53.5	5 34.8	+10 50.7	-0.6831	0.5950	-0.0609	-17	-90
B. A. C. 5709	6.3	1.17	5.1	24 56.3	16 53.2	- 2 18.7	-1.1346	0.5990	0.0273	-50	-90
26 Ophiuchi	6.1	1.17	5.1	24 50.1	16 57.6	- 2 14.5	-1.2407	0.5991	0.0270	-60	-90
31 Ophiuchi	6.7	1.16	4.8	25 30.1	18 40.6	- 0 35.7	-0.6077	0.5995	0.0218	-16	-87
B. A. C. 5800	7.5	1.13	4.1	26 51.8	22 14.1	+ 2 48.9	+0.7054	0.6002	0.0110	+61	- 1
A Ophiuchi	4.9	+1.12	- 4.2	-26 27.2	22 41.0	+ 3 14.6	+0.2877	0.6003	-0.0096	+31	-26
B. A. C. 5813	6.8	1.11	4.2	26 24.1	23 0.9	+ 3 33.7	+0.2314	0.6005	-0.0086	+27	-29
$\lambda$ Sagittarii	2.9	0.82	3.1	25 28.8	16 2 2.4	+ 5 27.8	+0.1895	0.5986	+0.0736	+31	-31
B. A. C. 6304	7.0	0.79	3.4	24 11.1	4 3.8	+ 7 24.3	-0.9565	0.5981	0.0796	-32	-90
24 Sagittarii	5.9	0.80	3.4	24 6.5	4 18.7	+ 7 38.5	-1.0129	0.5980	0.0803	-35	-90
25 Sagittarii	6.3	+0.79	- 3.3	-24 18.0	4 33.6	+ 7 52.8	-0.8003	0.5979	+0.0810	-21	-90
26 Sagittarii	6.6	0.75	3.3	23 55.8	7 21.2	+10 33.6	-0.9358	0.5969	0.0887	-29	-90
B. A. C. 6607	5.9	0.61	2.9	22 35.6	22 22.4	+ 0 58.4	-0.6253	0.5900	0.1306	- 7	-88
$\chi^3$ Sagittarii	5.6	0.61	2.4	24 9.8	17 0 15.3	+ 2 46.8	+1.2018	0.5889	0.1353	+66	+37
50 Sagittarii	5.9	0.60	2.9	21 58.8	0 36.8	+ 3 7.5	-0.9442	0.5887	0.1360	-25	-90
$\sigma$ Capricorni	5.6	+0.46	- 2.3	-19 26.2	22 3.6	- 0 15.5	-0.0391	0.5748	+0.1850	+30	-44
$\pi$ Capricorni	5.1	0.44	2.3	18 32.8	18 1 22.0	+ 2 55.4	-0.3143	0.5724	0.1914	+16	-60
$\rho$ Capricorni	5.3	0.43	2.3	18 9.1	2 1.0	+ 3 33.1	-0.5880	0.5720	0.1927	+ 1	-82
B. A. C. 7044	7.0	0.43	2.3	18 12.7	2 4.6	+ 3 36.5	-0.5164	0.5719	0.1928	+ 5	-75
$\theta$ Capricorni	6.2	0.44	2.2	18 55.3	2 26.4	+ 3 57.4	+0.2699	0.5716	0.1935	+47	-27
$\nu$ Capricorni	5.7	+0.40	- 2.1	-18 29.9	6 43.1	+ 8 4.7	+0.6882	0.5686	+0.2013	+71	- 4
B. A. C. 7263	5.9	0.36	2.0	16 25.5	14 16.7	- 8 38.3	+0.1656	0.5632	0.2138	+44	-33
29 Capricorni	5.7	0.34	1.7	15 35.7	22 10.2	- 1 1.6	+1.0615	0.5575	0.2252	+74	+19
18 Aquarii	5.7	0.31	1.7	13 19.0	19 1 55.8	+ 2 36.2	-0.3922	0.5549	0.2300	+17	-65
$\lambda$ Capricorni	5.7	0.28	- 1.3	-11 50.2	12 0.3	-11 40.0	+0.4802	0.5483	+0.2409	+66	-17
NEW MOON.											
19 Piscium	4.9	+0.28	+ 2.3	+ 2 55.3	21 21 38.1	- 3 53.0	-0.0497	0.5236	+0.2554	+39	-44
22 Piscium	5.0	0.30	2.3	2 21.8	22 0 24.6	- 1 11.5	+1.2409	0.5231	0.2541	+90	+32
36 Piscium	6.3	0.33	3.7	7 40.5	12 43.0	+10 44.3	-1.2470	0.5215	0.2473	-32	-82
$d$ Piscium	5.3	+0.34	+ 3.8	+ 7 37.5	14 44.2	-11 18.2	-0.6973	0.5214	+0.2459	+ 5	-82

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## FEBRUARY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
45 Piscium	6.9	+0.36	+ 3.8	+ 7 7.7	22 17 17.6	- 8 49.5	+0.4523	0.5212	+0.2440	+69	-17
75 Piscium	6.0	0.47	5.9	12 24.7	23 13 44.2	+10 59.7	-0.3495	0.5218	0.2251	+24	-58
7 Piscium	3.7	0.57	6.8	14 49.3	24 2 7.1	- 1 0.2	-0.2370	0.5234	0.2103	+31	-50
101 Piscium	6.3	0.59	6.8	14 8.5	4 15.0	+ 1 3.8	+0.9409	0.5237	0.2075	+90	+15
103 Piscium	6.8	0.60	7.4	16 6.6	5 57.1	+ 2 42.7	-0.8257	0.5240	0.2053	- 3	-74
105 Piscium	6.3	+0.61	+ 7.3	+15 53.4	6 9.6	+ 2 54.8	-0.5466	0.5240	+0.2050	+13	-67
3 Arietis	6.0	0.64	7.7	16 54.2	9 33.6	+ 6 12.6	-0.9506	0.5247	0.2003	-11	-73
4 Arietis	5.7	0.64	7.6	16 27.0	10 21.0	+ 6 58.5	-0.3037	0.5249	0.1992	+26	-51
4 Arietis	5.7	0.69	7.9	17 19.3	14 50.8	+11 19.8	-0.3642	0.5258	0.1928	+22	-54
15 Arietis	5.7	0.75	8.5	19 1.3	21 18.9	- 6 24.2	-0.9911	0.5273	0.1829	-15	-71
B. A. C. 686	7.2	+0.77	+8.6	+19 8.5	22 53.6	- 4 52.4	-0.8355	0.5276	+0.1805	- 5	-71
8 Arietis	5.7	0.79	8.7	19 25.9	25 0 57.8	- 2 52.1	-0.7805	0.5280	0.1771	- 1	-71
23 Arietis	7.5	0.80	8.6	19 13.4	1 27.7	- 2 23.3	-0.4666	0.5283	0.1763	+17	-58
26 Arietis	6.0	0.86	8.7	19 24.3	7 1.0	+ 2 59.5	+0.2904	0.5296	0.1672	+59	-16
$\mu$ Arietis	6.0	0.92	8.9	19 34.8	12 39.5	+ 8 27.3	+1.0177	0.5311	0.1573	+90	+26
$\epsilon$ Arietis	4.6	+1.03	+ 9.3	+20 56.1	20 41.4	- 7 46.3	+0.7453	0.5333	+0.1429	+90	+10
6 Arietis	6.0	1.22	9.5	22 27.3	26 10 28.2	+ 5 33.7	+0.8703	0.5369	0.1163	+90	+21
7 Tauri	6.0	1.27	10.0	24 7.5	13 15.0	+ 8 15.1	-0.6498	0.5378	0.1107	+ 5	-63
9 Tauri	7.0	1.29	9.5	22 52.6	14 27.2	+ 9 24.9	+0.8556	0.5379	0.1082	+90	+21
g Pleiadum	6.3	1.35	9.7	23 58.3	18 5.1	-11 4.3	+0.0299	0.5388	0.1007	+44	-31
17 Tauri	4.3	+1.34	+ 9.7	+23 47.7	18 7.4	-11 2.1	+0.2277	0.5388	+0.1005	+56	-12
18 Tauri	6.3	1.35	9.9	24 31.3	18 14.6	-10 55.2	-0.5601	0.5388	0.1004	+10	-56
19 Tauri	5.0	1.35	9.8	24 9.0	18 16.2	-10 53.6	-0.1480	0.5389	0.1003	+33	-32
20 Tauri	5.0	1.35	9.7	24 3.1	18 33.7	-10 36.8	-0.0107	0.5389	0.0997	+41	-24
21 Tauri	7.0	1.35	9.8	24 14.3	18 35.7	-10 34.7	-0.2133	0.5389	0.0997	+30	-35
22 Tauri	7.0	+1.35	+ 9.8	+24 12.7	18 39.7	-10 30.9	-0.1773	0.5390	+0.0995	+32	-33
23 Tauri	4.7	1.35	9.6	23 38.0	18 48.1	-10 22.8	+0.4740	0.5390	0.0992	+73	+ 1
7 Tauri	3.1	1.36	9.6	23 47.5	19 20.2	- 9 51.7	+0.3515	0.5391	0.0981	+64	- 6
26 Tauri	7.0	1.37	9.5	23 32.8	20 1.3	- 9 12.0	+0.6886	0.5393	0.0967	+90	+13
27 Tauri	4.0	1.37	9.6	23 44.8	20 7.1	- 9 6.4	+0.4808	0.5393	0.0965	+74	+ 1
28 Tauri	6.2	+1.37	+ 9.6	+23 49.6	20 7.7	- 9 5.8	+0.3899	0.5393	+0.0965	+67	- 4
36 Tauri	6.0	1.48	9.2	23 49.6	27 3 9.8	- 2 17.8	+1.0173	0.5409	0.0815	+90	+35
$\chi$ Tauri	5.7	1.64	9.3	25 23.6	11 31.5	+ 5 47.2	-0.1022	0.5425	+0.0633	+36	-26
118 Tauri	5.7	2.06	6.7	25 4.2	17 58.6	+11 12.7	+1.1366	0.5455	-0.0058	+90	+51
125 Tauri	6.0	+2.15	+ 6.4	+25 50.5	28 22 43.2	- 8 12.4	+0.2292	0.5455	-0.0167	+56	- 4

## MARCH.

139 Tauri	5.3	+2.26	+ 5.5	+25 56.6	1 7 2.3	- 0 10.1	-0.1006	0.5451	-0.0357	+36	-23
$\epsilon$ Geminorum	3.2	+2.52	+ 2.6	+25 14.0	2 4 7.1	- 3 47.9	-0.5685	0.5426	-0.0827	+10	-55
$\omega$ Geminorum	5.7	2.59	1.2	24 21.7	12 41.8	+ 4 29.7	-0.3966	0.5410	0.1010	+20	-46
44 Geminorum	6.0	2.58	0.5	22 47.4	14 4.5	+ 5 49.6	+1.1888	0.5407	0.1039	+90	+47
48 Geminorum	6.0	2.64	+ 0.6	24 18.0	17 22.1	+ 9 0.8	-0.8224	0.5400	0.1107	- 5	-66
$\delta$ Geminorum	3.5	2.64	- 0.6	22 10.2	21 0.3	-11 28.2	+1.0981	0.5391	0.1181	+90	+37
58 Geminorum	6.3	+2.67	0.5	+23 8.5	22 33.2	- 9 58.4	-0.1532	0.5388	-0.1212	+33	-34
63 Geminorum	5.7	2.66	1.2	21 39.2	3 0 35.5	- 8 0.1	+1.2266	0.5383	0.1253	+90	+49
85 Geminorum	6.3	2.75	3.5	20 9.1	13 49.9	+ 4 48.5	+1.0362	0.5349	0.1506	+90	+29
$d^1$ Cancri	6.0	2.82	5.7	18 39.5	4 3 9.5	- 6 17.6	+0.4929	0.5315	0.1738	+74	- 6
$\theta$ Cancri	5.7	2.84	6.3	18 26.2	7 9.0	- 2 25.7	+0.0253	0.5304	0.1803	+43	-31
$\delta$ Cancri	4.0	+2.88	- 7.3	+18 31.6	13 31.5	+ 3 44.7	-1.2518	0.5289	-0.1901	-38	-71
54 Cancri	6.3	2.84	8.2	15 43.6	16 40.6	+ 6 47.9	+1.1679	0.5281	0.1948	+90	+34
$\alpha^1$ Cancri	5.7	2.86	8.6	15 42.7	19 43.5	+ 9 45.0	+0.5822	0.5274	0.1992	+81	- 5
$\alpha^2$ Cancri	6.0	2.87	8.6	15 58.2	19 53.1	+ 9 54.4	+0.2711	0.5274	0.1994	+58	-21
$\pi^1$ Cancri	6.3	2.89	9.6	15 24.2	5 3 11.0	- 7 1.3	-0.6106	0.5259	0.2092	+ 9	-71
$\pi^2$ Cancri	6.0	+2.90	- 9.8	+15 21.7	4 36.7	- 5 38.2	-0.8650	0.5256	-0.2111	- 5	-75

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## MARCH.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
$\xi$ Leonis	5.3	+2.87	-11.3	+11 44.9	d h m 5 12 58.1	h m + 2 27.7	+1.2015	0.5241	-0.2211	+90	+33
18 Leonis	3.8	2.89	12.2	12 16.6	20 10.3	+ 9 26.6	-0.9841	0.5231	0.2289	-13	-78
19 Leonis	6.0	2.89	12.3	12 2.2	20 41.9	+ 9 57.3	-0.8493	0.5231	0.2294	- 4	-78
10 Sextantis	7.0	2.86	13.1	9 24.8	6 1 14.5	- 9 38.5	+0.8934	0.5226	0.2338	+90	+ 9
11 Sextantis	6.0	2.86	13.3	8 47.8	2 5.5	- 8 49.1	+1.3487	0.5225	0.2345	+90	+48
43 Leonis	5.0	+2.86	-14.7	+ 7 3.4	14 36.8	+ 3 19.3	+0.1878	0.5218	-0.2445	+52	-31
34 Sextantis	6.7	2.84	15.7	4 6.7	7 0 30.3	-11 5.3	+0.8426	0.5222	0.2504	+90	+ 4
35 <sup>1</sup> Sextantis	6.2	2.85	15.6	5 16.6	0 50.8	-10 45.4	-0.4699	0.5222	0.2506	+17	-69
$\rho^3$ Leonis	6.2	2.83	16.6	2 30.3	12 42.1	+ 0 44.2	-0.5575	0.5235	0.2551	+13	-76
$\rho^5$ Leonis	5.7	2.81	16.8	+ 0 28.8	16 7.0	+ 4 2.8	+0.6878	0.5242	0.2559	+89	- 6
$\eta$ Virginis	5.7	+2.73	-17.7	- 8 53.7	9 7 8.9	- 6 8.8	+0.4787	0.5371	-0.2473	+68	-17
75 Virginis	6.0	2.65	16.3	14 50.6	10 10 18.3	- 3 53.8	+0.1909	0.5525	0.2202	+46	-31
83 Virginis	6.0	2.64	16.1	15 40.2	15 27.3	+ 1 4.4	-0.0796	0.5559	0.2130	+31	-46
85 Virginis	6.5	2.63	16.2	15 15.6	15 56.4	+ 1 32.5	-0.6027	0.5563	0.2123	+ 4	-82
B. A. C. 4722	5.8	2.58	14.8	17 43.7	11 4 50.2	-10 1.3	-0.6896	0.5648	0.1912	- 4	-90
42 Libræ	5.7	+2.39	-10.4	-23 29.4	12 15 30.3	- 0 40.0	-0.2089	0.5865	-0.1141	+14	-54
A <sup>2</sup> Scorpii	5.2	2.37	9.4	25 1.5	20 42.8	+ 4 20.2	+0.7889	0.5891	0.1004	+65	+ 4
B. A. C. 5253	5.8	2.36	9.6	24 13.9	20 50.5	+ 4 27.6	-0.0282	0.5891	0.1000	+22	-43
B. A. C. 5254	5.8	2.36	9.8	23 40.6	20 51.8	+ 4 28.8	-0.5928	0.5892	0.1000	- 8	-85
3 Scorpii	6.7	2.37	9.3	24 56.9	21 7.6	+ 4 44.1	+0.6649	0.5893	0.0993	+62	- 4
B. A. C. 5314	5.7	+2.34	- 8.8	-25 35.0	13 0 30.4	+ 7 58.7	+0.9924	0.5908	-0.0900	+64	+18
$\sigma$ Scorpii	3.4	2.27	8.2	25 21.0	7 24.9	- 9 23.5	+0.2010	0.5933	0.0707	+31	-30
$\alpha$ Scorpii	1.2	2.25	7.5	26 12.5	10 33.8	- 6 22.3	+0.8612	0.5944	0.0616	+64	+ 9
22 Scorpii	5.5	2.22	7.9	24 53.6	10 53.6	- 6 3.2	-0.4905	0.5945	0.0607	- 6	-75
25 Scorpii	7.0	2.17	7.0	25 20.7	17 15.8	+ 0 3.4	-0.3606	0.5960	0.0420	- 1	-65
B. A. C. 5709	6.3	+2.10	- 6.6	-24 56.3	22 16.3	+ 4 51.7	-0.9451	0.5968	-0.0272	-35	-90
26 Ophiuchi	6.1	2.10	6.6	24 50.1	22 20.7	+ 4 55.9	-1.0516	0.5968	0.0270	-43	-90
31 Ophiuchi	6.7	2.09	6.2	25 30.1	14 0 4.6	+ 6 35.4	-0.4196	0.5970	0.0218	- 6	-69
B. A. C. 5800	7.5	2.07	5.3	26 51.8	3 40.4	+10 2.4	+0.9009	0.5972	0.0111	+63	+12
A Ophiuchi	4.9	2.06	5.3	26 27.3	4 7.7	+10 28.6	+0.4815	0.5972	0.0097	+43	-14
B. A. C. 5813	6.8	+2.05	- 5.4	-26 24.1	4 27.6	+10 47.6	+0.4249	0.5973	-0.0087	+39	-18
38 Ophiuchi	6.7	2.05	5.3	26 31.1	4 58.7	+11 17.5	+0.5393	0.5973	0.0072	+47	-11
B. A. C. 5846	6.8	2.01	5.7	24 48.3	6 33.0	-11 12.0	-1.2037	0.5986	0.0024	-58	-90
$\theta$ Ophiuchi	3.3	2.02	5.5	24 54.0	6 40.1	-11 5.2	-1.1080	0.5986	-0.0021	-49	-90
63 Ophiuchi	6.6	1.85	4.2	24 52.0	19 12.7	+ 0 56.6	-0.9357	0.5986	+0.0353	-34	-90
$\lambda$ Sagittarii	2.9	+1.70	- 2.6	-25 28.7	15 7 55.8	-10 51.3	+0.3735	0.5923	+0.0722	+41	-21
B. A. C. 6304	7.0	1.66	2.9	24 11.1	9 59.8	- 8 52.3	-0.7838	0.5915	0.0780	-21	-90
24 Sagittarii	5.9	1.66	2.9	24 6.5	10 15.2	- 8 37.5	-0.8408	0.5914	0.0787	-24	-90
25 Sagittarii	6.3	1.66	2.8	24 18.0	10 30.4	- 8 22.9	-0.5694	0.5914	0.0794	- 9	-82
26 Sagittarii	6.6	1.61	2.6	23 55.7	13 21.7	- 5 38.4	-0.7652	0.5900	0.0873	-21	-90
B. A. C. 6369	6.2	+1.61	- 2.1	-25 6.8	14 30.1	- 4 32.8	+0.5371	0.5895	+0.0904	+54	-11
B. A. C. 6448	6.4	1.53	2.2	23 18.2	18 55.8	- 0 17.6	-0.8714	0.5874	0.1023	-24	-90
B. A. C. 6607	5.9	1.41	1.5	22 35.6	16 4 44.8	+ 9 8.3	-0.4643	0.5821	0.1275	+ 2	-72
50 Sagittarii	5.9	1.38	1.5	21 58.7	7 2.7	+11 20.9	-0.7893	0.5808	0.1331	-16	-90
$\sigma$ Capricorni	5.6	1.12	0.4	19 26.2	17 5 4.6	+ 8 33.1	+0.1018	0.5665	0.1808	+37	-36
$\pi$ Capricorni	5.1	+1.07	- 0.4	-18 32.8	8 28.6	+11 49.7	-0.1809	0.5641	+0.1872	+23	-52
$\sigma$ Capricorni	5.3	1.06	0.5	18 9.1	9 8.7	-11 31.6	-0.4589	0.5637	0.1884	+ 9	-71
B. A. C. 7044	7.0	1.06	0.4	18 12.6	9 12.4	-11 28.1	-0.3865	0.5636	0.1885	+12	-65
$\nu$ Capricorni	6.2	1.06	- 0.2	18 55.2	9 34.7	-11 6.6	+0.4086	0.5634	0.1891	+55	-20
$\rho$ Capricorni	5.7	1.00	+ 0.1	18 29.8	13 58.6	- 6 52.1	+0.8259	0.5618	0.1968	+72	+ 4
B. A. C. 7263	5.9	+0.92	+ 0.0	-16 25.5	21 44.6	+ 0 37.4	+0.2850	0.5553	+0.2091	+50	-26
29 Capricorni	5.7	0.83	0.4	15 35.7	18 5 50.7	+ 8 26.7	+1.1782	0.5501	0.2204	+74	+28
18 Aquarii	5.7	0.79	0.2	13 19.0	9 42.2	-11 49.7	-0.2991	0.5478	0.2251	+22	-59
$\lambda$ Capricorni	5.7	0.71	0.4	11 50.2	20 1.5	- 1 51.1	+0.5642	0.5419	0.2361	+72	-12
50 Capricorni	6.9	0.71	0.5	12 9.9	20 6.0	- 1 46.8	+0.9201	0.5418	0.2362	+78	+ 8
36 Aquarii	6.3	+0.62	+ 0.6	- 8 41.2	19 6 51.0	+ 8 37.1	-0.0738	0.5364	+0.2449	+36	-46

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.											
MARCH.											
THE STAR'S					AT CONJUNCTION IN R. A.						Limiting Parallels
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
$\theta$ Aquarii	4.4	+0.60	+0.7	- 8 17.5	19 10 22.7	-11 58.0	+0.3859	0.5348	+0.2472	+62	-22
$\rho$ Aquarii	5.6	0.59	0.8	8 20.0	11 59.9	-10 23.8	+0.8307	0.5341	0.2482	+82	+ 3
$\kappa$ Aquarii	5.2	0.52	0.8	4 45.2	20 31.0	- 2 9.0	-0.7416	0.5307	0.2521	+ 2	-90
B. A. C. 7951 ( <i>mean</i> )	6.7	0.50	1.1	- 4 45.5	20 1 26.5	+ 2 37.1	+0.5081	0.5290	0.2538	+75	-15
NEW MOON.											
75 Piscium	6.0	+0.36	+4.4	+12 24.6	22 22 38.1	- 2 18.5	-0.4825	0.5247	+0.2244	+16	-66
$\eta$ Piscium	3.7	0.41	5.2	14 49.3	23 10 56.4	+ 9 37.0	-0.3912	0.5270	0.2100	+21	-58
101 Piscium	6.3	0.43	5.3	14 8.5	13 3.3	+11 39.9	+0.7805	0.5275	0.2072	+90	+ 5
103 Piscium	6.8	0.43	5.5	16 6.6	14 44.7	-10 41.9	-0.9868	0.5278	0.2050	-14	-74
105 Piscium	6.3	0.43	5.5	15 53.4	14 57.1	-10 29.8	-0.7101	0.5279	0.2048	+ 3	-74
3 Arietis	6.0	+0.45	+5.8	+16 54.2	18 19.4	- 7 13.8	-1.1173	0.5287	+0.2001	-24	-73
4 Arietis	5.7	0.45	5.8	16 27.0	19 6.5	- 6 28.2	-0.4723	0.5288	0.1990	+16	-16
6 Arietis	5.7	0.48	6.0	17 19.3	23 34.0	- 2 9.1	-0.5398	0.5300	0.1926	+13	-65
15 Arietis	5.7	0.51	6.5	19 1.2	24 5 58.6	+ 4 3.4	-1.1752	0.5316	0.1829	-30	-71
B. A. C. 686	7.2	0.52	6.6	19 8.3	7 32.3	+ 5 34.1	-1.0225	0.5320	0.1804	-17	-71
$\theta$ Arietis	5.7	+0.53	+6.7	+19 25.9	9 35.3	+ 7 33.3	-0.9705	0.5325	+0.1771	-14	-71
23 Arietis	7.5	0.54	6.6	19 13.4	10 4.9	+ 8 1.9	-0.6578	0.5327	0.1763	+ 6	-69
26 Arietis	6.0	0.58	6.8	19 24.3	15 35.1	-10 38.4	+0.0898	0.5338	0.1671	+47	-26
$\mu$ Arietis	6.0	0.61	7.0	19 34.7	21 10.3	- 5 10.1	+0.8082	0.5356	0.1577	+90	+13
47 Arietis	6.0	0.69	7.2	20 15.7	25 4 35.5	+ 1 56.8	+1.1844	0.5363	0.1439	+90	+42
$\epsilon$ Arietis	4.6	+0.69	+7.4	+20 56.1	5 7.6	+ 2 27.7	+0.5273	0.5377	+0.1430	+77	- 1
66 Arietis	6.0	0.82	7.7	22 27.3	18 46.9	- 8 19.8	+0.6382	0.5409	0.1161	+89	- 8
7 Tauri	6.0	0.85	8.1	24 7.5	21 32.4	- 5 39.8	-0.8805	0.5415	0.1165	-10	-66
9 Tauri	7.0	0.89	7.8	22 52.5	22 43.9	- 4 30.8	+0.6195	0.5417	0.1080	+87	+ 8
$g$ Pleiadum	6.3	0.93	8.0	23 58.2	26 2 20.2	- 1 1.4	-0.2068	0.5425	0.1005	+30	-35
17 Tauri	4.3	+0.93	+8.0	+23 47.7	2 22.3	- 0 59.4	-0.0095	0.5425	+0.1004	+41	-24
18 Tauri	6.3	0.93	8.2	24 31.3	2 29.5	- 0 52.5	-0.7957	0.5425	0.1002	- 4	-65
19 Tauri	5.0	0.93	8.1	24 9.0	2 31.2	- 0 50.8	-0.3844	0.5425	0.1001	+20	-45
20 Tauri	5.0	0.94	8.0	24 3.1	2 48.4	- 0 34.2	-0.2479	0.5426	0.0995	+28	-37
21 Tauri	7.0	0.94	8.1	24 14.3	2 50.5	- 0 32.1	-0.4498	0.5426	0.0994	+16	-49
22 Tauri	7.0	+0.94	+8.1	+24 12.7	2 54.4	- 0 28.4	-0.4142	0.5426	+0.0993	+18	-47
23 Tauri	4.7	0.94	7.9	23 38.0	3 2.7	- 0 20.4	+0.2356	0.5426	0.0990	+56	-12
$\eta$ Tauri	3.1	0.95	7.9	23 47.5	3 34.7	+ 0 10.6	+0.1130	0.5427	0.0979	+48	-18
B. A. C. 1170	6.3	0.95	7.7	23 6.6	3 59.3	+ 0 34.4	+0.9024	0.5428	0.0970	+90	+25
26 Tauri	7.0	0.95	7.8	23 32.8	4 15.4	+ 0 49.9	+0.4486	0.5429	0.0965	+71	0
27 Tauri	4.0	+0.95	+7.9	+23 44.6	4 21.2	+ 0 55.5	+0.2412	0.5430	+0.0963	+56	-11
28 Tauri	6.2	0.95	7.9	23 49.6	4 21.8	+ 0 56.1	+0.1506	0.5430	0.0962	+51	-16
36 Tauri	6.0	1.04	7.7	23 49.6	11 20.9	+ 7 41.2	+0.7714	0.5441	0.0812	+90	+19
$\chi$ Tauri	5.7	1.15	8.0	25 23.4	19 39.9	- 8 16.6	-0.3511	0.5452	0.0630	+22	-40
62 Tauri	6.0	1.16	7.5	24 3.9	20 20.4	- 7 37.4	+1.1527	0.5455	0.0614	+90	+48
$k$ Tauri	6.0	+1.37	+7.0	+24 53.7	27 11 53.8	+ 7 24.5	+0.9237	0.5462	+0.0264	+90	+34
118 Tauri	5.7	1.56	6.1	25 4.2	28 2 3.9	- 2 54.3	+0.8760	0.5458	-0.0060	+90	+33
125 Tauri	6.0	1.64	6.0	25 50.5	6 49.1	+ 1 41.3	+0.0326	0.5454	0.0168	+40	-18
139 Tauri	5.3	1.75	5.3	25 56.6	15 9.9	+ 9 45.2	-0.3634	0.5444	0.0356	+21	-38
5 Geminorum	6.7	1.82	4.3	24 26.6	21 24.9	- 8 12.4	+1.0285	0.5434	0.0496	+90	+39
$\epsilon$ Geminorum	3.2	+2.03	+3.0	+25 14.0	29 12 22.9	+ 6 15.7	-0.8303	0.5403	-0.0820	- 7	-65
$\omega$ Geminorum	5.7	2.13	1.7	24 21.7	21 2.3	- 9 21.9	-0.6552	0.5381	0.1000	+ 5	-62
44 Geminorum	6.0	2.12	1.1	22 47.4	22 25.8	- 8 1.2	+0.9349	0.5378	0.1029	+90	+27
48 Geminorum	6.0	2.19	1.2	24 18.0	30 1 45.5	- 4 48.2	-1.0809	0.5369	0.1095	-25	-66
$\delta$ Geminorum	3.5	2.19	0.1	22 10.2	5 26.0	- 1 14.7	-0.8473	0.5359	0.1167	+90	+20
58 Geminorum	6.3	+2.23	+0.2	+23 8.5	6 59.9	+ 0 16.1	-0.4065	0.5354	-0.1198	+19	-49
63 Geminorum	5.7	2.23	-0.5	21 39.2	9 3.6	+ 2 15.8	+0.9786	0.5348	0.1238	+90	+28
79 Geminorum	6.3	2.31	2.0	20 33.6	17 23.6	+10 19.7	+1.0788	0.5325	0.1391	+90	+33
85 Geminorum	6.0	2.35	2.7	20 9.2	22 27.5	- 8 46.1	+0.7949	0.5311	0.1485	+90	+13
$\alpha$ Cancri	6.0	2.47	4.8	18 39.5	31 11 57.0	+ 4 17.9	+0.2647	0.5275	0.1713	+57	-18
$\theta$ Cancri	5.7	+2.50	-5.3	+18 26.2	15 59.5	+ 8 12.7	-0.2001	0.5265	-0.1777	+31	-43

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		$\alpha$	$\delta$	$\alpha$	d h m	h m				$\alpha$	$\delta$
54 Cancri	6.3	+2.54	-7.5	+15 43.6	1 1 37.9	-6 26.8	+0.9583	0.5243	-0.1920	+90	+18
$\alpha^1$ Cancri	5.7	2.57	7.8	15 42.7	4 42.8	-3 27.7	+0.3751	0.5237	0.1963	+68	-15
$\alpha^2$ Cancri	6.0	2.57	7.8	15 58.2	4 52.6	-3 18.2	+0.0630	0.5236	0.1965	+45	-32
$\pi^1$ Cancri	6.3	2.63	8.8	15 24.3	12 15.2	+3 50.8	-0.8101	0.5224	0.2062	-3	-75
$\pi^2$ Cancri	6.0	2.64	8.9	15 21.7	13 41.8	+5 14.7	-1.0663	0.5221	0.2080	-19	-75
$\xi$ Leonis	5.3	+2.65	-10.9	+11 44.9	22 8.0	-10 34.5	+1.0225	0.5211	-0.2180	+90	+19
18 Leonis	6.0	2.70	11.6	12 16.6	2 5 23.7	-3 32.0	-1.1544	0.5205	0.2258	-25	-78
19 Leonis	7.0	2.70	12.1	12 2.2	5 55.5	-3 1.1	-1.0180	0.5205	0.2263	-15	-78
10 Sextantis	6.0	2.69	12.9	9 24.8	10 29.9	+1 24.9	+0.7350	0.5203	0.2307	+90	0
11 Sextantis	6.0	2.69	13.1	8 47.8	11 21.2	+2 14.7	+1.1934	0.5203	0.2315	+90	+31
$\pi$ Leonis	5.0	+2.70	-13.2	+8 31.8	12 24.7	+3 16.2	+1.2316	0.5203	-0.2325	+90	+34
43 Leonis	6.5	2.75	14.6	7 3.4	23 55.8	-9 33.7	+0.0570	0.5207	0.2418	+45	-37
34 Sextantis	6.7	2.78	16.2	4 6.7	3 9 49.9	+0 2.3	+0.7335	0.5219	0.2479	+90	-3
35 <sup>1</sup> Sextantis	6.2	2.79	16.0	5 16.6	10 10.5	+0 22.4	-0.5769	0.5219	0.2481	+12	-77
$\beta^3$ Leonis	6.2	2.82	17.3	2 30.3	21 59.9	+11 50.0	-0.6337	0.5244	0.2530	+9	-83
$\beta^6$ Leonis	5.7	+2.83	-17.8	+0 28.8	4 1 23.7	-8 52.5	+0.6163	0.5253	-0.2540	+82	-9
$\gamma$ Virginis	5.7	2.94	19.9	-8 53.7	5 15 57.4	+4 27.6	+0.5059	0.5426	0.2471	+70	-15
75 Virginis	6.0	3.04	19.3	14 50.6	6 18 31.2	+6 6.8	+0.2860	0.5606	0.2209	+51	-26
83 Virginis	6.0	3.05	18.9	15 40.3	23 32.3	+10 57.2	+0.0280	0.5643	0.2138	+36	-40
85 Virginis	6.5	3.05	18.8	15 15.6	7 0 0.7	+11 24.6	-0.4857	0.5647	0.2131	+10	-72
B. A. C. 4722	5.8	+3.08	-17.8	-17 43.8	12 33.7	-0 30.0	-0.5433	0.5741	-0.1920	+5	-77
42 Libræ	5.7	3.11	13.0	23 29.4	8 22 16.0	+7 53.4	-0.0095	0.5960	0.1144	+24	-42
A <sup>2</sup> Libræ	5.2	3.12	11.9	25 1.6	9 3 20.5	-11 14.7	+0.9826	0.5984	0.1004	+65	+18
B. A. C. 5253	5.8	3.10	12.0	24 13.9	3 27.8	-11 7.6	+0.1760	0.5984	0.1001	+33	-31
B. A. C. 5254	5.8	3.09	12.1	23 40.6	3 29.0	-11 6.5	-0.3815	0.5985	0.1000	+4	-66
3 Scorpïi	6.7	+3.11	-11.8	-24 56.7	3 44.5	-10 51.6	+0.8609	0.5986	-0.0993	+65	+9
B. A. C. 5314	5.7	3.11	11.2	25 35.0	7 2.0	-7 42.2	+1.1892	0.5999	0.0898	+64	+40
19 Scorpïi	5.1	3.04	10.5	23 55.6	13 35.1	-1 25.4	-0.9964	0.6020	0.0709	-35	-90
$\sigma$ Scorpïi	3.4	3.07	10.1	25 21.0	13 46.2	-1 14.7	+0.4159	0.6021	0.0704	+44	-18
$\alpha$ Scorpïi	1.2	3.07	9.4	26 12.5	16 50.6	+1 42.0	+1.0721	0.6028	0.0613	+64	+26
22 Scorpïi	5.5	+3.04	-9.7	-24 53.6	17 9.9	+2 0.5	-0.2638	0.6029	-0.0603	+5	-58
25 Scorpïi	7.0	3.00	8.5	25 20.7	23 23.4	+7 58.4	-0.1288	0.6039	0.0415	+11	-49
18 Ophiuchi	6.7	3.00	8.2	24 27.9	10 0 29.0	+9 1.4	-1.0544	0.6040	0.0382	-42	-90
B. A. C. 5709	6.3	2.95	7.7	24 56.3	4 17.6	-11 19.6	-0.7027	0.6041	0.0265	-21	-90
26 Ophiuchi	6.1	2.95	7.7	24 50.1	4 21.9	-11 15.5	-0.8082	0.6041	0.0263	-27	-90
31 Ophiuchi	6.7	+2.95	-7.2	-25 30.1	6 3.7	-9 37.9	-0.1810	0.6043	-0.0211	+6	-53
B. A. C. 5800	7.5	2.95	6.3	26 51.9	9 35.3	-6 15.2	+1.1303	0.6043	0.0103	+63	+32
A Ophiuchi	4.9	2.92	6.6	26 27.3	10 2.0	-5 49.7	+0.7151	0.6043	0.0089	+62	0
B. A. C. 5813	6.8	2.92	6.6	26 24.1	10 21.6	-5 30.9	+0.6592	0.6043	0.0079	+57	-4
38 Ophiuchi	6.7	2.92	6.2	26 31.1	10 52.2	-5 1.5	+0.7730	0.6040	0.0064	+63	+3
B. A. C. 5846	6.8	+2.88	-6.4	-24 48.5	12 24.7	-3 32.9	-0.9526	0.6039	-0.0016	-38	-90
$\theta$ Ophiuchi	3.3	2.88	6.6	24 54.0	12 31.6	-3 26.2	-0.8575	0.6038	-0.0013	-32	-90
63 Ophiuchi	6.6	2.74	4.1	24 52.0	11 0 12.6	+8 23.5	-0.6767	0.6010	+0.0361	-18	-90
7 Sagittarii	5.9	2.69	3.8	24 16.9	3 53.2	+11 16.9	-1.1419	0.5999	0.0451	-49	-90
9 Sagittarii	6.0	2.69	3.8	24 21.8	4 16.4	+11 39.2	-1.0424	0.5997	0.0463	-41	-90
$\lambda$ Sagittarii	2.9	+2.61	-1.9	-25 28.7	13 26.6	-3 33.2	+0.6271	0.5946	+0.0728	+58	-6
B. A. C. 6304	7.0	2.56	2.0	24 11.1	15 29.6	-1 35.2	-0.5231	0.5945	0.0786	-6	-78
24 Sagittarii	5.9	2.55	1.9	24 6.5	15 44.8	-1 20.6	-0.5798	0.5944	0.0793	-9	-83
25 Sagittarii	6.3	2.56	1.8	24 18.0	15 59.9	-1 6.1	-0.3664	0.5943	0.0800	+2	-65
B. A. C. 6343	6.3	2.51	1.8	23 35.5	17 32.5	+1 22.8	-0.9541	0.5934	0.0843	-31	-90
26 Sagittarii	6.6	+2.50	-1.5	-23 55.7	18 49.9	+1 37.1	-0.5039	0.5927	+0.0878	-4	-76
B. A. C. 6369	6.2	2.52	0.9	25 6.8	19 57.8	+2 42.2	+0.7932	0.5916	0.0909	+65	+4
$\nu^1$ Sagittarii	5.0	2.42	1.1	22 52.2	23 39.0	+6 14.6	-1.1194	0.5897	0.1007	-42	-90
$\nu^2$ Sagittarii	5.1	2.42	1.0	22 47.9	12 0 1.2	+6 35.9	-1.1546	0.5895	0.1017	-45	-90
B. A. C. 6448	6.5	2.42	-0.8	23 18.2	0 22.0	+6 56.0	-0.6089	0.5893	0.1026	-8	-85
B. A. C. 6607	5.9	+2.28	+0.4	-22 35.6	10 9.2	-7 39.9	-0.2029	0.5827	+0.1274	+15	-54

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

APRIL.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
50 Sagittarii	5.9	+2.25	+0.5	-21 58.7	12 12 27.0	- 5 27.5	-0.5271	0.5810	+0.1329	- 1	-77
$\sigma$ Capricorni	5.6	1.92	2.5	19 26.2	13 10 33.8	- 8 10.4	+0.3569	0.5641	0.1793	+51	-22
$\pi$ Capricorni	5.1	1.86	2.6	18 32.7	13 59.4	- 4 52.2	+0.0713	0.5619	0.1854	+36	-38
$\rho$ Capricorni	5.3	1.84	2.5	18 9.0	14 39.9	- 4 13.1	-0.2076	0.5610	0.1865	+22	-54
B. A. C. 7044	7.0	1.86	2.5	18 12.6	14 43.6	- 4 9.6	-0.1353	0.5609	0.1866	+25	-49
$\phi$ Capricorni	6.2	+1.86	+2.8	-18 55.2	15 6.1	- 3 47.9	+0.6616	0.5607	+0.1873	+70	- 5
$\nu$ Capricorni	5.7	1.78	3.1	18 29.8	19 32.6	+ 0 29.2	+1.0778	0.5573	0.1946	+72	+22
B. A. C. 7263	5.9	1.66	3.3	16 25.4	14 3 23.8	+ 8 4.0	+0.5288	0.5515	0.2064	+65	-13
18 Aquarii	5.7	1.48	3.4	13 18.9	15 31.2	- 4 13.3	-0.0714	0.5432	0.2218	+33	-45
$\lambda$ Capricorni	5.7	1.36	3.7	11 50.1	15 2 0.4	+ 5 55.2	+0.7832	0.5369	0.2322	+70	0
50 Capricorni	6.9	+1.36	+3.8	-12 9.9	2 4.9	+ 5 59.5	+1.1381	0.5368	+0.2323	+78	+24
36 Aquarii	6.3	1.22	3.7	8 41.2	13 1.1	- 7 25.4	+0.1228	0.5311	0.2406	+46	-35
$\theta$ Aquarii	4.4	1.18	3.9	8 17.4	16 36.6	- 3 56.7	+0.5794	0.5295	0.2427	+75	-11
$\rho$ Aquarii	5.6	1.16	4.0	8 19.9	18 15.6	- 2 20.7	+1.0249	0.5295	0.2437	+82	+15
$\kappa$ Aquarii	5.2	1.05	3.4	4 45.2	16 2 16.1	+ 6 3.5	-0.5767	0.5254	0.2475	+11	-78
B.A.C.7951 (mean)	6.7	+1.01	+3.7	-4 45.4	7 57.1	+10 55.2	+0.6728	0.5237	+0.2490	+84	- 6
$\kappa$ Piscium	4.7	0.84	3.8	+0 41.9	17 3 38.8	+ 6 1.1	-0.1275	0.5195	0.2502	+35	-48
9 Piscium	6.6	0.84	3.8	0 33.8	3 48.4	+ 6 10.4	+0.0572	0.5195	0.2502	+45	-38
15 Piscium	6.6	0.80	3.9	0 45.0	7 59.5	+10 13.9	+0.9035	0.5191	0.2495	+90	+ 7
16 Piscium	5.8	0.80	3.8	1 32.1	8 27.7	+10 41.3	+0.1902	0.5191	0.2495	+52	-31
$\lambda$ Piscium	4.5	+0.78	+4.0	+1 13.2	11 20.4	-10 31.1	+1.2435	0.5188	+0.2487	+90	+32
19 Piscium	4.9	0.76	3.8	2 55.3	13 32.9	- 8 22.7	-0.0078	0.5187	0.2481	+41	-42
22 Piscium	5.0	0.75	4.1	2 21.9	16 23.0	- 5 37.6	+1.2851	0.5186	0.2473	+90	+37
$d$ Piscium	5.3	0.65	3.9	7 37.5	18 6 57.6	+ 8 30.7	-0.7442	0.5192	0.2401	+ 3	-80
45 Piscium	6.9	0.65	4.1	7 7.7	9 32.9	+11 1.4	+0.4035	0.5195	0.2384	+65	-19
NEW MOON.											
47 Arietis	6.0	+0.63	+5.9	+20 15.7	21 12 18.4	+11 27.4	+1.0449	0.5393	+0.1422	+90	+31
$\epsilon$ Arietis	4.6	0.63	5.9	20 56.0	12 50.5	+11 58.4	+0.3854	0.5394	0.1412	+66	- 8
66 Arietis	6.0	0.70	6.1	22 27.2	22 2 28.7	+ 1 9.7	+0.4692	0.5432	0.1146	+72	- 1
7 Tauri	6.0	+0.72	+6.3	+24 7.4	5 13.8	+ 3 49.6	-1.0561	0.5438	+0.1090	-23	-66
9 Tauri	7.0	0.73	6.3	22 52.5	6 25.2	+ 4 58.4	+0.4435	0.5441	0.1066	+70	- 2
$\gamma$ Pleiadum	6.3	0.75	6.4	23 58.2	10 1.1	+ 8 27.1	-0.3896	0.5445	0.0991	+20	-45
17 Tauri	4.3	0.75	6.3	23 47.7	10 3.3	+ 8 29.3	-0.1927	0.5445	0.0991	+30	-34
18 Tauri	6.3	0.75	6.4	24 31.2	10 10.5	+ 8 36.2	-0.0796	0.5449	0.0988	-17	-75
19 Tauri	5.0	+0.75	+6.4	+24 8.9	10 12.1	+ 8 37.8	-0.5680	0.5449	+0.0987	+ 9	57
20 Tauri	5.0	0.75	6.4	24 3.0	10 29.3	+ 8 54.3	-0.4319	0.5450	0.0981	+17	-48
21 Tauri	7.0	0.75	6.4	24 14.3	10 31.4	+ 8 56.4	-0.6340	0.5440	0.0980	+ 6	-61
22 Tauri	7.0	0.76	6.4	24 12.7	10 35.3	+ 9 0.1	-0.5985	0.5450	0.0979	+ 8	-59
23 Tauri	4.7	0.76	6.3	23 37.9	10 43.6	+ 9 8.2	+0.0514	0.5451	0.0976	+44	-21
$\eta$ Tauri	3.1	+0.76	+6.3	+23 47.5	11 15.4	+ 9 38.9	-0.0722	0.5452	+0.0965	+37	-27
B. A. C. 117c	6.3	0.76	6.2	23 6.6	11 40.0	+10 2.7	+0.7172	0.5453	0.0956	+90	+14
26 Tauri	7.0	0.76	6.3	23 32.8	11 56.1	+10 18.3	+0.2620	0.5453	0.0951	+57	- 9
27 Tauri	4.0	0.76	6.3	23 44.6	12 1.9	+10 23.9	+0.0553	0.5453	0.0948	+45	-21
28 Tauri	6.2	0.77	6.3	23 49.6	12 2.5	+10 24.5	-0.0357	0.5453	0.0948	+39	-25
36 Tauri	6.0	+0.82	+6.2	+23 49.6	19 0.6	- 6 51.5	+0.5735	0.5465	+0.0799	+82	+ 8
$\chi$ Tauri	5.7	0.89	6.3	25 23.4	23 3 18.4	+ 1 9.5	-0.5630	0.5476	0.0616	+ 9	-53
62 Tauri	6.0	0.89	6.1	24 3.9	3 58.7	+ 1 48.6	+0.0406	0.5477	0.0601	+90	+32
$\kappa$ Tauri	6.0	1.05	5.7	24 53.7	19 30.5	- 7 11.2	+0.6891	0.5483	+0.0251	+90	+20
118 Tauri	5.7	1.19	5.1	25 4.2	24 9 40.1	+ 6 29.7	+0.6236	0.5473	-0.0071	+89	+18
125 Tauri	6.0	+1.25	+5.0	+25 50.5	14 25.5	+11 5.5	-0.2913	0.5467	-0.0179	+25	-32
132 Tauri	5.3	1.29	4.4	24 32.1	18 42.0	- 8 46.7	+1.0602	0.5461	0.0275	+90	+43
139 Tauri	5.3	1.34	4.5	25 56.6	22 47.2	- 4 49.8	-0.6317	0.5453	0.0366	+ 5	-57
5 Geminorum	6.7	1.40	3.7	24 26.6	25 5 3.3	+ 1 13.7	+0.7572	0.5439	0.0498	+90	+21
8 Geminorum	6.5	1.42	3.4	24 0.2	7 16.3	+ 3 22.3	+1.1278	0.5433	0.0553	+90	+46
$\epsilon$ Geminorum	3.2	+1.59	+2.7	+25 14.0	20 5.7	- 8 13.8	-1.1194	0.5397	-0.0825	-30	-65



## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## APRIL.

THE STAR'S				AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.	
		$\Delta\alpha$	$\Delta\delta$									
		$\alpha$	$\delta$	$\alpha$	d h m	h m				$\alpha$	$\delta$	
$\omega$ Geminorum	5.7	+1.68	+ 1.7	+24 21.7	26 4 48.9	+ 0 12.4	-0.9498	0.5369	-0.1002	-15	-66	
44 Geminorum	6.0	1.67	1.1	22 47.4	6 13.1	+ 1 33.8	+0.6459	0.5364	0.1029	+90	+ 9	
$\delta$ Geminorum	3.5	1.74	0.3	22 10.2	13 17.2	+ 8 24.3	+0.5545	0.5340	0.1166	+80	+ 3	
58 Geminorum	6.3	1.77	+ 0.4	23 8.5	14 52.1	+ 9 56.1	-0.7068	0.5335	0.1196	+ 1	-67	
63 Geminorum	5.7	1.78	- 0.2	21 39.2	16 57.0	+11 57.0	+0.6853	0.5328	0.1235	+90	+ 9	
79 Geminorum	6.3	+1.85	- 1.4	+20 33.6	27 1 22.8	- 3 53.4	+0.7840	0.5298	-0.1387	+90	+13	
85 Geminorum	6.0	1.91	2.1	20 9.2	6 30.7	+ 1 4.9	+0.4976	0.5280	0.1476	+74	- 3	
$\alpha$ Cancri	6.0	2.02	4.1	18 39.5	20 12.0	- 9 39.4	-0.0352	0.5235	0.1697	+38	-34	
B. A. C. 2810	7.0	2.02	4.4	17 30.8	20 54.5	- 8 58.3	+1.0992	0.5232	0.1707	+90	+31	
$\alpha$ Cancri	6.0	2.02	4.5	17 22.9	21 27.6	- 8 26.2	+1.1500	0.5231	0.1716	+90	+35	
$\theta$ Cancri	5.7	+2.07	- 4.4	+18 26.3	28 0 18.5	- 5 40.4	-0.5027	0.5223	-0.1758	+14	-61	
54 Cancri	6.3	2.13	6.4	15 43.6	10 6.9	+ 3 50.1	+0.6671	0.5196	0.1896	+89	+ 1	
$\phi$ Cancri	5.7	2.16	6.7	15 42.7	13 15.1	+ 6 52.5	+0.0813	0.5188	0.1938	+46	-31	
$\alpha$ Cancri	6.0	2.17	6.6	15 58.3	13 25.1	+ 7 2.2	-0.2332	0.5188	0.1940	+29	-47	
$\pi$ Cancri	6.3	2.22	7.5	15 24.3	20 55.9	- 9 40.6	-1.1084	0.5172	0.2034	-23	-75	
$\pi$ Cancri	6.0	+2.25	- 7.7	+15 21.8	22 24.1	- 8 15.0	-1.3619	0.5169	-0.2051	-57	-75	
$\xi$ Leonis	5.3	2.28	9.8	11 44.9	29 7 0.0	+ 0 5.4	+0.7465	0.5157	0.2148	+90	+ 2	
$\phi$ Leonis	3.8	2.31	10.7	10 21.2	11 44.6	+ 4 41.5	+1.2199	0.5152	0.2196	+90	+34	
19 Leonis	7.0	2.36	10.4	12 2.2	14 56.7	+ 7 48.0	-1.3020	0.5149	0.2227	-41	-78	
10 Sextantis	6.0	2.37	11.7	9 24.8	19 36.4	-11 40.7	+0.4711	0.5147	0.2270	+70	-15	
11 Sextantis	6.0	+2.37	-12.0	+ 8 47.8	20 28.7	-10 49.9	+0.9332	0.5147	-0.2278	+90	+11	
$\pi$ Leonis	5.0	2.38	12.2	8 31.8	21 33.4	- 9 47.2	+0.9732	0.5147	0.2287	+90	+14	
43 Leonis	6.5	2.47	13.6	7 3.4	30 9 17.5	+ 1 35.9	-0.1932	0.5152	0.2377	+31	-51	
34 Sextantis	6.7	2.51	15.5	4 6.7	19 22.2	+11 22.6	+0.5054	0.5167	0.2438	+73	-15	
35 Sextantis	6.2	+2.53	-15.1	+ 5 16.6	19 43.2	+11 43.0	-0.8139	0.5168	-0.2439	- 2	-85	

## MAY.

$\beta$ Leonis	6.2	+2.60	-16.7	+ 2 30.3	1 7 44.0	- 0 37.6	-0.8471	0.5198	-0.2489	- 4	-87
$\beta$ Leonis	5.7	+2.63	-17.4	+ 0 28.8	11 10.8	+ 2 42.7	+0.4173	0.5210	-0.2498	+66	-20
B. A. C. 4006	6.1	2.80	19.6	- 4 46.3	2 5 40.5	- 3 21.9	+1.2351	0.5290	0.2511	+85	+32
$\eta$ Virginis	5.7	2.97	20.6	8 53.7	8 2 4.2	- 7 37.5	+0.4001	0.5417	0.2440	+63	-20
75 Virginis	6.0	3.18	20.8	14 50.7	4 4 33.2	- 6 3.1	+0.2521	0.5629	0.2191	+49	-28
83 Virginis	6.0	3.24	20.5	15 40.3	9 31.5	- 1 15.5	+0.0116	0.5673	0.2122	+35	-41
85 Virginis	6.5	+3.24	-20.4	-15 15.7	9 59.5	- 0 48.6	-0.5003	0.5678	-0.2115	+ 9	-73
B. A. C. 4722	5.8	3.35	19.6	17 43.8	22 23.0	+11 7.3	-0.5234	0.5787	0.1909	+ 5	-75
42 Libræ	5.7	3.62	14.7	23 29.4	6 7 23.9	- 5 10.9	+0.0891	0.6046	0.1137	+29	-36
$\Delta$ Scorpii	5.2	3.67	13.7	25 1.6	12 20.5	- 0 26.7	+1.0797	0.6074	0.0996	+65	+26
B. A. C. 5253	5.8	3.65	13.7	24 14.0	12 27.0	- 0 20.0	+0.2838	0.6074	0.0992	+38	-25
B. A. C. 5254	5.8	+3.63	-13.8	-23 40.7	12 28.8	- 0 18.8	-0.2668	0.6075	-0.0992	+ 9	-58
3 Scorpii	6.7	3.66	13.6	24 56.7	12 43.9	- 0 4.2	+0.9603	0.6076	0.0984	+65	+16
19 Scorpii	5.1	3.65	11.8	23 55.6	22 18.2	+ 9 5.7	-0.8517	0.6118	0.0699	-26	-90
$\phi$ Scorpii	3.4	3.68	11.6	25 21.1	22 28.9	+ 9 15.9	+0.5418	0.6119	0.0693	+52	-11
$\alpha$ Scorpii	1.2	3.71	10.9	26 12.5	7 1 28.0	-11 52.8	+1.1951	0.6129	0.0601	+64	+40
22 Scorpii	5.5	+3.67	-11.0	-24 53.6	1 46.8	-11 34.7	-0.1217	0.6129	-0.0591	+13	-49
25 Scorpii	7.0	3.68	9.4	25 20.7	7 49.4	- 5 47.7	+0.0235	0.6143	0.0402	+19	-40
18 Ophiuchi	6.7	3.68	9.2	24 27.9	8 53.0	- 4 46.8	-0.8869	0.6147	0.0368	-31	-90
B. A. C. 5709	6.3	3.66	8.5	24 56.3	12 34.7	- 1 14.7	-0.5327	0.6148	0.0251	-11	-79
26 Ophiuchi	6.1	3.66	8.5	24 50.2	12 38.9	- 1 10.7	-0.6364	0.6147	0.0248	-17	-90
31 Ophiuchi	6.7	+3.67	- 8.0	-25 30.1	14 17.6	+ 0 23.7	-0.0153	0.6146	-0.0196	+15	-42
A Ophiuchi	4.9	3.67	7.3	26 27.3	18 8.7	+ 4 4.8	+0.8742	0.6145	0.0073	+64	+11
B. A. C. 5813	6.8	3.67	7.3	26 24.1	18 27.7	+ 4 22.9	-0.8199	0.6145	0.0062	+64	+ 7
38 Ophiuchi	6.7	3.67	6.8	26 31.1	18 57.3	+ 4 51.3	+0.9330	0.6145	-0.0047	+63	+15
B. A. C. 5846	6.8	3.62	6.7	24 48.3	20 27.0	+ 6 17.2	-0.7657	0.6144	+0.0001	-27	-90
$\theta$ Ophiuchi	3.3	+3.63	- 6.7	-24 54.0	20 33.7	+ 6 23.6	-0.6702	0.6144	+0.0005	-21	-90

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>
		$\Delta\alpha$	$\Delta\delta$								
		<i>s</i>	<i>"</i>	<i>°</i>	<i>d</i> <i>h</i> <i>m</i>	<i>h</i> <i>m</i>				<i>°</i>	<i>'</i>
63 Ophiuchi	6.6	+3.55	-3.8	-24 52.0	8 8 31.7	- 6 9.3	-0.4713	0.6114	+0.0384	- 8	-73
7 Sagittarii	5.9	3.51	3.3	24 16.9	11 27.1	- 3 21.4	-0.9248	0.6104	0.0474	-33	-90
9 Sagittarii	6.0	3.52	3.2	24 21.8	11 49.6	- 2 59.9	-0.8263	0.6102	0.0486	-26	-90
$\lambda$ Sagittarii	2.9	3.46	1.0	25 28.7	20 43.5	+ 5 31.4	+0.8321	0.6057	0.0753	+65	+ 7
B. A. C. 6304	7.0	3.41	0.9	24 11.0	22 42.8	+ 7 25.7	-0.2986	0.6045	0.0811	+60	-60
24 Sagittarii	5.9	+3.41	-0.8	-24 6.5	22 57.5	+ 7 39.8	-0.3541	0.6044	+0.0817	+ 3	-64
25 Sagittarii	6.3	3.41	0.7	24 18.0	23 12.2	+ 7 53.9	-0.1435	0.6042	0.0825	+14	-50
B. A. C. 6343	6.3	3.36	0.5	23 35.5	9 42.1	+ 9 20.0	-0.7205	0.6032	0.0869	-16	-90
26 Sagittarii	6.6	3.36	-0.3	23 55.7	1 57.3	+10 32.1	-0.2751	0.6024	0.0904	+ 8	-58
B. A. C. 6369	6.2	3.38	+0.4	25 6.8	3 3.2	+11 35.2	+1.0046	0.6017	0.0935	+65	+20
$\nu^1$ Sagittarii	5.0	+3.29	+0.6	-22 52.2	6 38.2	- 8 58.6	-0.8757	0.5992	+0.1034	-24	-90
$\nu^2$ Sagittarii	5.1	3.28	0.6	22 47.9	6 59.8	- 8 38.0	-0.9099	0.5989	0.1044	-26	-90
B. A. C. 6448	6.4	3.29	0.8	23 18.2	7 20.0	- 8 18.5	-0.3716	0.5987	0.1053	+ 5	-65
B. A. C. 6607	5.9	3.17	2.5	22 35.5	16 51.3	+ 0 49.7	+0.0400	0.5913	0.1301	+28	-39
50 Sagittarii	5.9	3.13	2.8	21 58.7	19 5.6	+ 2 58.6	-0.2759	0.5893	0.1355	+12	-58
$\sigma$ Capricorni	5.6	+3.79	+5.9	-19 26.1	10 16 42.3	- 0 14.4	+0.6143	0.5701	+0.1814	+66	- 8
$\pi$ Capricorni	5.1	2.74	6.2	18 32.7	20 4.1	+ 3 0.0	+0.3344	0.5671	0.1874	+51	-23
$\rho$ Capricorni	5.3	2.73	6.1	18 8.9	20 43.7	+ 3 38.2	+0.0583	0.5665	0.1885	+35	-38
B. A. C. 7044	7.0	2.73	6.1	18 12.5	20 47.3	+ 3 41.6	+0.1299	0.5665	0.1886	+39	-34
$\phi$ Capricorni	6.2	2.74	6.4	18 55.1	21 9.5	+ 4 3.0	+0.9192	0.5661	0.1892	+71	+11
B. A. C. 7263	5.7	+2.52	+7.3	-16 25.3	11 9 15.2	- 8 17.3	+0.7916	0.5543	+0.2073	+74	+ 2
18 Aquarii	5.7	2.32	7.7	13 18.5	21 13.7	+ 3 16.6	+0.1992	0.5461	0.2224	+47	-31
$\alpha$ Capricorni	6.4	2.13	7.5	9 44.7	12 7 31.3	-10 46.3	-1.1296	0.5384	0.2321	-26	-90
$\lambda$ Capricorni	5.7	2.15	8.2	11 50.1	7 37.4	-10 40.3	+1.0469	0.5384	0.2322	+78	+18
36 Aquarii	6.3	2.00	8.2	8 41.1	18 34.8	- 0 4.2	+0.3848	0.5315	0.2398	+62	-21
$\theta$ Aquarii	4.4	+1.95	+8.4	- 8 17.3	22 9.7	+ 3 23.8	+0.8377	0.5295	+0.2418	+82	+ 4
$\rho$ Aquarii	5.6	1.93	8.5	8 19.9	23 48.4	+ 4 59.5	+1.2806	0.5287	0.2426	+82	+37
$\kappa$ Aquarii	5.2	1.80	7.9	4 45.1	13 8 28.7	-10 36.5	-0.3252	0.5245	0.2459	+24	-60
B. A. C. 7951 (mean)	6.7	1.75	8.1	- 4 45.3	13 30.1	- 5 44.4	+0.9178	0.5225	0.2471	+85	+ 8
$\kappa$ Piscium	4.7	1.51	7.7	+ 0 41.9	14 9 17.0	-10 33.4	+0.0912	0.5170	0.2474	+46	-37
9 Piscium	6.6	+1.51	+7.8	+ 0 33.8	9 26.7	-10 23.9	+0.2738	0.5170	+0.2473	+57	-27
15 Piscium	6.6	1.47	7.8	0 45.1	13 39.5	- 6 18.8	+1.1173	0.5164	0.2465	+90	+22
16 Piscium	5.8	1.46	7.6	1 32.3	14 7.9	- 5 51.2	+0.4017	0.5163	0.2464	+65	-20
19 Piscium	4.9	1.41	7.5	2 55.4	19 15.4	- 0 52.8	+0.1943	0.5158	0.2449	+52	-31
36 Piscium	6.3	1.26	6.8	7 40.5	15 10 45.0	- 9 50.7	-1.1235	0.5157	0.2378	-23	-82
$d$ Piscium	5.3	+1.25	+6.9	+ 7 37.5	12 49.5	- 7 49.9	-0.5786	0.5158	+0.2365	+11	-76
45 Piscium	6.9	1.23	7.2	7 7.8	15 26.5	- 5 17.6	+0.5688	0.5160	0.2348	+78	-10
75 Piscium	6.0	1.08	6.5	12 24.7	16 12 16.2	- 9 5.3	-0.3822	0.5197	0.2175	+21	-59
$\eta$ Piscium	3.7	1.01	6.3	14 49.3	17 0 47.7	+ 3 3.5	-0.3495	0.5232	0.2038	+23	-55
101 Piscium	6.3	1.00	6.4	14 8.5	2 56.7	+ 5 8.6	+0.8228	0.5238	0.2011	+90	+ 9
103 Piscium	6.8	+0.99	+6.1	+16 6.6	4 39.7	+ 6 48.4	-0.9680	0.5243	+0.1989	-13	-74
105 Piscium	6.3	0.99	6.2	15 53.4	4 52.3	+ 7 0.6	-0.6882	0.5244	0.1987	+ 4	-74
3 Arietis	6.0	0.98	6.0	16 54.2	8 17.6	+10 19.7	-1.1167	0.5255	0.1942	-25	-73
4 Arietis	5.7	0.96	6.1	16 27.0	9 5.3	+11 5.9	-0.4700	0.5258	0.1932	+16	-61
$\iota$ Arietis	5.7	0.95	6.1	17 19.3	13 36.5	- 8 31.4	-0.5588	0.5274	0.1870	+11	-66
15 Arietis	5.7	+0.93	+5.9	+19 1.2	20 5.7	- 2 14.3	-1.2283	0.5297	+0.1776	-37	-71
B. A. C. 686	7.2	0.93	5.9	19 8.5	21 40.5	- 0 42.4	-1.0814	0.5302	0.1752	-23	-71
$\theta$ Arietis	5.7	0.92	5.9	19 25.8	23 44.9	+ 1 18.1	-1.0388	0.5310	0.1721	-19	-71
23 Arietis	7.5	0.92	5.9	19 13.4	18 0 14.8	+ 1 46.9	-0.7255	0.5312	0.1713	+ 1	-71
26 Arietis	6.0	0.91	5.9	19 24.2	5 48.0	+ 7 9.7	+0.0023	0.5332	0.1624	+41	-31
$\mu$ Arietis	6.0	+0.89	+6.0	+19 34.7	11 25.9	-11 23.2	+0.7003	0.5352	+0.1529	+90	+ 7
47 Arietis	6.0	0.89	5.9	20 15.7	18 53.9	- 4 9.6	+1.0461	0.5379	0.1396	+90	+31
$\epsilon$ Arietis	4.6	+0.89	+5.8	+20 56.0	19 26.2	- 3 38.4	+0.3831	0.5381	+0.1387	+65	- 8
NEW MOON.											
118 Tauri	5.7	+1.11	+4.1	+25 4.1	21 16 26.9	- 8 56.0	+0.4889	0.5487	-0.0088	+75	+10

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

MAY.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		s	"	° ' "	d h m	h m				°	°
125 Tauri	6.0	+1.15	+ 4.0	+25 50.5	21 21 12.4	- 4 20.1	-0.4361	0.5481	-0.0195	+17	-41
Venus				24 31.6	22 0 43.8	- 0 55.9	+0.9412	0.4918	0.0310	+90	+34
132 Tauri	5.3	1.17	3.5	24 32.1	1 29.1	- 0 12.1	+0.9109	0.5473	0.0291	+90	+33
139 Tauri	5.3	1.20	3.3	25 56.5	5 34.5	+ 3 45.1	-0.7903	0.5465	0.0382	- 5	-64
5 Geminorum	6.7	1.24	2.9	24 26.6	11 51.0	+ 9 49.0	+0.5919	0.5451	0.0520	+84	+12
8 Geminorum	6.5	+1.25	+ 2.7	+24 0.2	14 4.3	+11 57.9	+0.9600	0.5445	-0.0568	+90	+33
9 Geminorum	6.3	1.25	2.7	23 46.5	14 22.8	-11 44.2	+1.1950	0.5444	0.0575	+89	+53
6 Geminorum	5.7	1.42	1.3	24 21.7	23 11 39.8	+ 8 50.8	-1.1529	0.5374	0.1014	-33	-66
44 Geminorum	6.0	1.41	0.8	22 47.4	13 4.3	+10 12.5	+0.4462	0.5369	0.1042	+71	- 1
6 Geminorum	3.5	1.47	0.1	22 10.2	20 10.2	- 6 55.2	+0.3465	0.5341	0.1177	+63	- 8
58 Geminorum	6.3	+1.49	+ 0.2	+23 8.5	21 45.5	- 5 22.9	-0.9207	0.5335	-0.1207	-12	-67
63 Geminorum	5.7	1.49	- 0.3	21 39.2	23 51.1	- 3 21.4	+0.4732	0.5327	0.1245	+72	- 3
79 Geminorum	6.3	1.56	1.3	20 33.7	24 8 20.1	+ 4 51.6	+0.5633	0.5292	0.1395	+80	+ 1
85 Geminorum	6.0	1.60	1.8	20 9.2	13 30.4	+ 9 52.0	+0.2707	0.5271	0.1482	+57	-15
d <sup>1</sup> Cancri	6.0	1.70	3.5	18 39.5	25 3 19.1	- 0 44.7	-0.2767	0.5217	0.1697	+26	-47
B. A. C. 2810	7.0	+1.70	- 3.8	+17 30.8	4 2.1	- 0 3.0	+0.8639	0.5214	-0.1707	+90	+14
d <sup>2</sup> Cancri	6.0	1.69	3.9	17 22.9	4 35.4	+ 0 29.3	+0.9153	0.5212	0.1716	+90	+18
6 Cancri	5.7	1.74	3.8	18 26.3	7 28.3	+ 3 16.9	-0.7501	0.5202	0.1753	0	-70
54 Cancri	6.3	1.79	5.5	15 43.6	17 24.2	-11 5.0	+0.4216	0.5168	0.1890	+67	-12
d <sup>1</sup> Cancri	5.7	1.83	5.8	15 42.7	20 35.0	- 8 0.0	-0.1696	0.5158	0.1930	+32	-44
d <sup>2</sup> Cancri	6.0	+1.83	- 5.7	+15 58.3	20 45.1	- 7 50.2	-0.4861	0.5157	-0.1932	+15	-62
5 Leonis	5.3	1.94	8.6	11 44.9	26 14 37.6	+ 9 30.8	+0.4961	0.5113	0.2128	+72	-12
o Leonis	3.8	1.97	9.3	10 21.2	19 27.1	- 9 47.8	+0.9741	0.5104	0.2176	+90	+15
10 Sextantis	6.0	2.04	10.4	9 24.8	27 3 28.8	- 2 0.5	+0.2194	0.5095	0.2246	+54	-28
11 Sextantis	6.0	2.04	10.7	8 47.9	4 22.3	- 1 8.6	+0.6839	0.5095	0.2252	+89	- 3
$\pi$ Leonis	5.0	+2.05	-10.9	+ 8 31.8	5 28.3	- 0 4.5	+0.7269	0.5094	-0.2261	+90	- 1
43 Leonis	6.5	2.15	12.3	7 3.4	17 28.3	+11 34.6	-0.4482	0.5092	0.2341	+18	-67
34 Sextantis	6.7	2.23	14.4	4 6.7	28 3 47.4	- 2 24.4	+0.2642	0.5102	0.2401	+56	-27
35 <sup>1</sup> Sextantis	6.2	2.24	14.0	5 16.6	4 8.8	- 2 3.5	-1.0689	0.5102	0.2402	+18	-85
$\rho^3$ Leonis	6.2	2.33	15.6	2 30.3	16 27.8	+ 9 53.7	-1.0928	0.5129	0.2446	-20	-87
$\rho^4$ Leonis	5.7	+2.36	-16.3	+ 0 28.8	20 0.0	-10 40.3	+0.1892	0.5138	-0.2455	+52	-31
B. A. C. 4006	6.1	2.54	19.0	- 4 46.3	29 14 58.0	+ 7 43.7	+1.0402	0.5217	0.2464	+85	+16
$\gamma$ Virginis	5.7	2.77	20.0	8 53.7	30 11 51.3	+ 3 57.6	+0.2283	0.5348	0.2394	+52	-29
69 Virginis	5.0	3.10	21.2	15 27.1	31 12 28.1	+ 3 45.0	+1.2638	0.5555	0.2181	+75	+39
75 Virginis	6.0	3.13	21.0	14 50.7	14 51.1	+ 6 3.0	+0.1310	0.5577	0.2153	+42	-34
83 Virginis	6.0	+3.22	-20.8	-15 40.3	19 53.9	+10 55.1	-0.1013	0.5625	-0.2085	+29	-47
85 Virginis	6.5	+3.22	-20.7	-15 15.6	20 22.3	+11 22.4	-0.6153	0.5630	-0.2079	+ 3	-83

JUNE.

B. A. C. 4722	5.8	+3.40	-20.1	-17 43.8	1 8 54.5	- 0 33.0	-0.6110	0.5753	-0.1878	0	-84
42 Libræ	5.7	3.90	15.8	23 29.5	2 18 0.2	+ 7 13.7	+0.0742	0.6058	0.1118	+28	-37
A <sup>2</sup> Scorpii	5.2	3.99	14.9	25 1.6	22 55.1	+11 56.1	+1.0717	0.6094	0.0979	+65	+25
B. A. C. 5253	5.8	3.97	14.8	24 14.0	23 2.1	-11 57.2	+0.6095	0.6095	0.0975	+38	-26
B. A. C. 5254	5.8	+3.95	-14.8	-23 40.7	23 3.4	-11 56.0	-0.2701	0.6095	-0.0975	+ 9	-58
3 Scorpii	6.7	3.99	14.8	24 56.7	23 18.2	-11 41.8	+0.9537	0.6097	0.0967	+65	+16
19 Scorpii	5.1	4.03	12.6	23 55.7	8 8 47.5	- 2 36.8	-0.8314	0.6153	0.0680	-25	-90
$\sigma$ Scorpii	3.4	4.07	12.6	25 21.1	8 58.1	- 2 26.7	+0.5549	0.6155	0.0677	+53	-10
$\alpha$ Scorpii	1.2	4.12	12.0	26 12.5	11 55.2	+ 0 22.7	+1.2097	0.6168	0.0585	+64	+42
22 Scorpii	5.5	+4.08	-11.8	-24 53.6	12 13.7	+ 0 40.4	-0.0985	0.6170	-0.0575	+14	-47
25 Scorpii	7.0	4.12	10.2	25 20.7	18 11.3	+ 6 22.4	+0.0572	0.6192	0.0385	+21	-38
18 Ophiuchi	6.7	4.13	9.9	24 27.9	19 14.0	+ 7 22.4	-0.8440	0.6195	0.0351	-28	-90
B. A. C. 5709	6.3	4.13	9.0	24 56.4	22 52.1	+10 50.9	-0.4862	0.6203	0.0234	- 9	-74
26 Ophiuchi	6.1	4.13	9.0	24 50.2	22 56.2	+10 54.8	-0.5878	0.6203	0.0231	-15	-84
31 Ophiuchi	6.7	+4.15	- 8.5	-25 30.1	4 0 33.4	-11 32.3	+0.0313	0.6206	-0.0178	+17	-39

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.												
JUNE.												
THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels		
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z	y	N.	S.	
		$\Delta\alpha$	$\Delta\delta$									
A Ophiuchi	4.9	+4.18	-8.0	-26 27.3	4 4 20.3	-7 55.5	+0.9201	0.6213	-0.0054	+64	+14	
B. A. C. 5813	6.8	4.18	7.9	26 24.1	4 38.9	-7 37.7	+0.8668	0.6213	0.0044	+64	+10	
38 Ophiuchi	6.7	4.20	7.3	26 31.1	5 8.0	-7 9.9	+0.9796	0.6213	-0.0027	+63	+18	
B. A. C. 5846	6.8	4.15	6.9	24 48.3	6 35.9	-5 45.8	-0.6990	0.6211	+0.0020	-23	-90	
θ Ophiuchi	3.3	4.15	6.9	24 54.0	6 42.6	-5 39.4	-0.6058	0.6211	0.0024	-17	-86	
5 Sagittarii	7.0	+4.15	-3.1	-24 16.6	20 19.1	+7 21.1	-0.8807	0.6189	+0.0467	-30	-90	
7 Sagittarii	5.9	4.15	2.8	24 16.9	21 16.3	+8 15.8	-0.8294	0.6187	0.0498	-26	-90	
9 Sagittarii	6.0	4.15	2.8	24 21.8	21 38.2	+8 36.8	-0.7312	0.6185	0.0509	-20	-90	
λ Sagittarii	2.9	4.17	-0.4	25 28.7	5 6 18.4	-7 5.7	+0.9214	0.6148	0.0781	+65	+14	
B. A. C. 6304	7.0	4.12	+0.1	24 11.0	8 14.5	-5 14.5	-0.1944	0.6137	0.0840	+12	-53	
24 Sagittarii	5.9	+4.12	+0.1	-24 6.5	8 28.8	-5 0.9	-0.2455	0.6136	+0.0847	+9	-56	
25 Sagittarii	6.3	4.12	0.2	24 18.0	8 43.1	-4 47.2	-0.0372	0.6133	0.0854	+20	-44	
B. A. C. 6343	6.3	4.06	0.7	23 35.5	10 10.5	-3 23.5	-0.6041	0.6126	0.0898	-10	-86	
26 Sagittarii	6.6	4.07	1.1	23 55.7	11 23.6	-2 13.5	-0.1626	0.6118	0.0934	+14	-51	
B. A. C. 6369	6.2	4.10	1.4	24 6.7	12 27.7	-1 12.3	+1.1014	0.6112	0.0965	+65	+28	
ν <sup>1</sup> Sagittarii	5.0	+4.02	+2.1	-22 52.2	15 56.5	+2 7.7	-0.7472	0.6089	+0.1066	-16	-90	
ν <sup>2</sup> Sagittarii	5.1	4.02	2.2	22 47.9	16 17.5	+2 27.8	-0.7804	0.6087	0.1076	-18	-90	
B. A. C. 6448	6.4	4.03	2.3	23 18.2	16 37.1	+2 46.6	-0.2464	0.6083	0.1085	+12	-57	
B. A. C. 6607	5.9	3.96	4.5	22 35.5	6 1 51.4	+11 37.7	+0.1712	0.6013	0.1335	+35	-32	
50 Sagittarii	5.9	3.92	4.9	21 58.6	4 1.6	-10 17.4	-0.1381	0.5995	0.1392	+19	-50	
σ Capricorni	5.6	+3.65	+9.1	-19 26.1	7 0 57.3	+9 48.5	+0.7684	0.5803	+0.1856	+71	+1	
π Capricorni	5.1	3.59	9.5	18 32.6	4 12.6	-11 3.7	+0.4965	0.5771	0.1916	+60	-14	
ρ Capricorni	5.3	3.57	9.6	18 8.9	4 51.1	-10 26.6	+0.2260	0.5765	0.1923	+44	-29	
B. A. C. 7044	7.0	3.57	9.5	18 12.5	4 54.6	-10 23.3	+0.2966	0.5765	0.1929	+49	-25	
ο Capricorni	6.2	3.59	9.9	18 55.1	5 16.0	-10 2.7	+1.0737	0.5761	0.1935	+71	+22	
B. A. C. 7263	5.9	+3.39	+11.3	-16 25.3	16 58.9	+1 14.2	+0.9627	0.5650	+0.2120	+74	+13	
9 Aquarii	6.8	3.31	10.9	13 55.6	18 30.3	+2 42.3	-1.2170	0.5636	0.2141	-38	-90	
18 Aquarii	5.7	3.19	12.2	13 18.8	8 4 35.6	-11 33.8	+0.3873	0.5546	0.2264	+59	-21	
ε <sup>1</sup> Capricorni	5.5	3.01	12.3	9 32.9	14 1.1	-2 27.8	-1.2508	0.5468	0.2353	-37	-90	
ε <sup>2</sup> Capricorni	6.4	3.00	12.5	9 44.6	14 35.7	-1 54.3	-0.9164	0.5463	0.2358	-11	-90	
λ Capricorni	5.7	+3.03	+13.1	-11 50.0	14 41.7	-1 48.5	+1.2305	0.5463	+0.2359	+78	+33	
B. A. C. 7620	6.5	2.98	13.1	10 47.3	17 57.5	+1 20.6	+0.9444	0.5438	0.2384	+79	+11	
36 Aquarii	6.3	2.86	13.3	8 41.0	9 1 21.8	+8 30.2	+0.5825	0.5384	0.2430	+75	-11	
θ Aquarii	4.4	2.82	13.5	8 17.2	4 51.4	+11 53.0	+1.0309	0.5362	0.2448	+82	+16	
51 Aquarii	5.8	2.75	12.9	5 21.0	8 21.3	-8 43.8	-1.1254	0.5339	0.2462	-24	-90	
κ Aquarii	5.2	+2.66	+13.1	-4 45.0	14 56.3	-2 21.4	-0.1165	0.5303	+0.2484	+34	-48	
B. A. C. 7951 (mean)	6.7	2.59	13.4	-4 45.3	19 51.5	+2 24.5	+1.1131	0.5276	0.2492	+85	+22	
κ Piscium	4.7	2.35	12.9	+0 42.0	10 15 18.0	-2 44.9	+0.2898	0.5202	0.2483	+58	-26	
9 Piscium	6.6	2.35	13.0	0 33.9	15 27.6	-2 35.6	+0.4714	0.5201	0.2413	+70	-17	
15 Piscium	6.6	2.30	13.0	0 45.2	19 36.9	+1 26.1	+1.3063	0.5191	0.2472	+90	+36	
16 Piscium	5.8	+2.29	+12.8	+1 32.2	20 5.0	+1 53.4	+0.5990	0.5190	+0.2470	+80	-10	
19 Piscium	4.9	2.23	12.6	2 55.5	11 1 8.9	+6 48.1	+0.3877	0.5180	0.2452	+64	-21	
36 Piscium	6.3	2.07	11.6	7 40.6	16 30.6	-2 17.8	-0.9332	0.5165	0.2373	-9	-82	
δ Piscium	5.3	2.05	11.7	7 37.6	18 33.9	-0 18.2	-0.3947	0.5165	0.2359	+21	-63	
45 Piscium	6.9	2.03	11.9	7 7.9	21 9.9	+2 13.2	+0.7449	0.5165	0.2341	+90	0	
75 Piscium	6.0	+1.84	+10.4	+12 24.7	12 17 55.9	-1 38.2	-0.2248	0.5187	+0.2159	+29	-50	
7 Piscium	3.7	1.74	9.7	14 49.4	18 6 27.8	+10 31.0	-0.2083	0.5215	0.2021	+30	-47	
101 Piscium	6.3	1.73	9.7	14 8.6	8 37.1	-11 23.7	+0.9607	0.5221	0.1992	+90	+18	
103 Piscium	6.8	1.72	9.2	16 6.6	10 20.3	-9 43.7	-0.8315	0.5226	0.1970	-4	-74	
105 Piscium	6.3	1.72	9.3	15 53.5	10 32.9	-9 31.5	-0.5522	0.5227	0.1967	+12	-67	
3 Arietis	6.0	+1.70	+8.9	+16 54.2	13 58.8	-6 11.8	-0.9850	0.5236	+0.1923	-15	-73	
4 Arietis	5.7	1.69	9.1	16 27.0	14 46.8	-5 25.3	-0.3391	0.5239	0.1912	+23	-53	
4 Arietis	5.7	1.66	8.8	17 19.3	19 18.7	-1 1.8	-0.4346	0.5253	0.1850	+18	-58	
15 Arietis	5.7	1.62	8.3	19 1.3	14 1 49.3	+5 16.7	-1.1139	0.5275	0.1756	-25	-71	
B. A. C. 686	7.2	1.61	8.3	19 8.3	3 24.5	+6 49.0	-0.9692	0.5280	0.1732	-14	-71	
θ Arietis	5.7	+1.60	+8.2	+19 25.9	5 29.5	+8 50.0	-0.9287	0.5287	+0.1700	-12	-71	

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JUNE.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels	
Name.	Magn.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>z</i>	<i>y</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
23 Arietis	7.5	+1.59	+ 8.2	+19 13.4	14 5 59.5	+ 9 19.1	-0.6166	0.5289	+0.1692	+ 7	-67
26 Arietis	6.0	1.56	8.1	19 24.3	11 34.3	- 9 16.6	+0.1039	0.5309	0.1603	+47	-25
$\mu$ Arietis	6.0	1.52	8.2	19 34.7	17 13.9	- 3 47.8	+0.7947	0.5329	0.1508	+90	+13
47 Arietis	6.0	1.50	7.9	20 15.7	15 0 44.3	+ 3 28.2	+1.1302	0.5355	0.1377	+90	+38
$\epsilon$ Arietis	4.6	1.50	7.7	20 56.1	1 16.7	+ 3 59.5	+0.4659	0.5358	0.1367	+72	- 4
66 Arietis	6.0	+1.44	+ 7.0	+22 27.3	15 3.7	- 6 40.3	+0.5012	0.5404	+0.1106	+75	+ 1
7 Tauri	6.0	1.43	6.5	24 7.4	17 50.4	- 3 59.1	-1.0408	0.5412	0.1050	-22	-66
9 Tauri	7.0	1.44	6.4	22 52.5	19 2.5	- 2 49.4	+0.4619	0.5416	0.1026	+72	0
$\gamma$ Pleiadum	6.3	1.43	6.1	23 58.2	22 40.2	+ 0 41.2	-0.3880	0.5426	0.0952	+20	-45
17 Tauri	4.3	1.43	6.2	23 47.6	22 42.4	+ 0 43.3	-0.1902	0.5426	0.0952	+30	-34
18 Tauri	6.3	+1.43	+ 6.1	+24 31.2	22 49.7	+ 0 50.4	-0.9809	0.5427	+0.0949	-18	-65
19 Tauri	5.0	1.43	6.1	24 8.9	22 51.3	+ 0 52.0	-0.5677	0.5427	0.0949	+ 9	-57
20 Tauri	5.0	1.43	6.1	24 3.0	23 8.7	+ 1 8.7	-0.4318	0.5428	0.0943	+17	-48
21 Tauri	7.0	1.42	6.1	24 14.2	23 10.8	+ 1 10.8	-0.6351	0.5428	0.0942	+ 6	-61
22 Tauri	7.0	1.42	6.1	24 12.7	23 14.7	+ 1 14.5	-0.5995	0.5428	0.0941	+ 8	-59
23 Tauri	4.7	+1.42	+ 6.2	+23 37.9	23 23.1	+ 1 22.6	+0.0529	0.5428	+0.0938	+44	-21
$\eta$ Tauri	3.1	1.42	6.1	23 47.5	23 55.2	+ 1 53.7	-0.0731	0.5429	0.0927	+37	-27
B. A. C. 1170	6.3	1.41	6.2	23 6.6	16 0 20.0	+ 2 17.7	+0.7184	0.5431	0.0918	+90	+15
26 Tauri	7.0	1.41	6.1	23 32.9	0 36.2	+ 2 33.3	+0.2578	0.5432	0.0913	+57	- 9
27 Tauri	4.0	1.42	6.1	23 44.6	0 41.9	+ 2 38.8	+0.0517	0.5432	0.0911	+44	-20
28 Tauri	6.2	+1.42	+ 6.1	+23 49.6	0 42.6	+ 2 39.5	-0.0393	0.5432	+0.0910	+39	-25
36 Tauri	6.0	1.40	5.9	23 49.6	7 44.1	+ 9 27.0	+0.5490	0.5450	0.0763	+80	+ 7
$\chi$ Tauri	5.7	1.39	5.1	25 23.4	16 5.2	- 6 28.7	-0.6196	0.5467	0.0583	+ 6	-57
62 Tauri	6.0	1.38	5.3	24 3.9	16 45.8	- 5 49.4	+0.8877	0.5469	0.0569	+90	+29
$\kappa$ Tauri	6.0	+1.38	+ 4.4	+24 53.6	17 8 22.0	+ 9 15.4	+0.5857	0.5486	+0.0220	+84	+14
NEW MOON.											
$\delta$ Geminorum	3.5	+1.48	- 0.3	+22 10.2	20 2 17.8	+ 0 59.9	+0.2744	0.5354	-0.1189	+58	-12
58 Geminorum	6.3	1.50	0.4	23 8.5	3 53.1	+ 2 32.1	-0.9961	0.5348	0.1219	-18	-67
63 Geminorum	5.7	1.49	0.8	21 39.2	5 58.7	+ 4 33.7	+0.3976	0.5339	0.1260	+67	- 6
79 Geminorum	6.3	+1.51	- 1.5	+20 33.6	14 27.5	-11 13.6	+0.4796	0.5308	-0.1407	+73	- 3
85 Geminorum	6.0	1.53	1.9	20 9.2	19 37.7	- 6 13.1	+0.7815	0.5283	0.1494	+52	-20
$\zeta^1$ Cancri	4.8	1.55	3.0	17 57.2	21 3 52.4	+ 1 46.3	+1.3312	0.5248	0.1624	+90	+64
$\alpha^1$ Cancri	6.0	1.58	3.4	18 39.5	9 27.5	+ 7 11.3	-0.3799	0.5227	0.1704	+21	-53
B. A. C. 2810	7.0	1.57	3.6	17 30.8	10 10.6	+ 7 53.0	+0.7632	0.5222	0.1718	+90	+ 8
$\alpha^2$ Cancri	6.0	+1.57	- 3.7	+17 22.9	10 44.0	+ 8 25.4	+0.8144	0.5220	-0.1726	+90	+11
$\theta$ Cancri	5.7	1.60	3.7	18 26.4	13 37.1	+11 13.2	-0.8578	0.5210	0.1766	- 7	-72
54 Cancri	6.3	1.63	5.0	15 43.6	23 34.8	- 3 6.9	+0.3097	0.5170	0.1897	+60	-18
$\sigma^1$ Cancri	5.7	1.66	5.2	15 42.7	22 2 46.5	- 0 1.0	-0.2866	0.5159	0.1936	+26	-51
$\sigma^2$ Cancri	6.0	1.66	5.2	15 58.3	2 56.6	+ 0 8.8	-0.6045	0.5158	0.1938	+ 9	-70
$\xi$ Leonis	5.3	+1.73	- 7.6	+11 45.0	20 55.5	- 6 23.9	+0.3718	0.5102	-0.2131	+63	-18
$\sigma$ Leonis	3.8	1.75	8.3	10 21.2	23 1 47.9	- 1 40.0	+0.8504	0.5092	0.2174	+90	+ 7
10 Sextantis	6.0	1.80	9.2	9 24.8	9 54.0	+ 6 12.1	+0.0879	0.5076	0.2240	+46	-34
11 Sextantis	6.0	1.81	9.4	8 47.9	10 48.2	+ 7 4.8	+0.5569	0.5075	0.2247	+77	-10
$\pi$ Leonis	5.0	1.81	9.6	8 31.9	11 54.9	+ 8 9.6	+0.5980	0.5074	0.2255	+80	- 8
43 Leonis	6.5	+1.90	-10.9	+ 7 3.4	24 0 4.2	- 4 2.0	-0.5891	0.5062	-0.2333	+11	-77
34 Sextantis	6.7	1.96	12.6	4 6.7	10 33.2	+ 6 9.0	+0.1280	0.5062	0.2383	+48	-34
35 <sup>1</sup> Sextantis	6.2	1.97	12.2	5 16.7	10 55.0	+ 6 30.3	-1.2179	0.5062	0.2385	-30	-85
36 Sextantis	6.6	1.96	13.0	3 1.2	11 54.4	+ 7 28.0	+0.9839	0.5064	0.2388	+90	+13
$\rho^1$ Leonis	5.4	2.03	14.3	0 32.7	21 43.1	- 7 0.2	+1.2871	0.5076	0.2419	+90	+37
$\rho^2$ Leonis	6.2	+2.06	-13.8	+ 2 30.3	23 28.1	- 5 18.2	-1.2434	0.5079	-0.2423	-33	-87
$\rho^3$ Leonis	5.7	2.09	14.6	+ 0 28.9	25 3 4.7	- 1 47.9	+0.0534	0.5086	0.2429	+44	-38
$\epsilon$ Leonis	5.3	2.17	15.9	- 2 26.7	11 46.0	+ 6 38.2	+1.0654	0.5109	0.2437	+88	+18
B. A. C. 4006	6.1	2.27	17.1	4 46.0	22 30.0	- 6 56.7	+0.9173	0.5149	0.2429	+85	+ 8
$\gamma$ Virginis	5.7	2.51	18.7	8 53.7	26 19 58.3	-10 7.5	+0.1093	0.5266	0.2353	+45	-35
69 Virginis	5.0	+2.90	-20.5	-15 27.0	21 20.2	- 9 35.0	+1.1781	0.5464	-0.2139	+75	+29

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## JUNE.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	Z	Y'	N.	S.
		Δα	Δδ		d h m	h m					
75 Virginis	6.0	+2.94	-20.2	-14 50.6	27 23 47.6	- 7 12.6	+0.0312	0.5486	-0.2110	+37	-40
83 Virginis	6.0	3.04	20.2	15 40.3	28 4 59.7	- 2 11.2	-0.1999	0.5534	0.2044	+24	-53
85 Virginis	6.5	3.04	20.0	15 15.6	5 28.9	- 1 43.0	-0.7205	0.5538	0.2037	- 3	-90
87 Virginis	5.8	3.07	20.7	17 21.3	6 16.5	- 0 57.1	+1.2625	0.5546	0.2027	+73	+40
B. A. C. 4722	5.8	3.27	19.7	17 43.8	18 23.7	+10 44.2	-0.7040	0.5663	0.1840	- 5	-90
42 Libræ	5.7	+3.93	-16.3	-23 29.5	30 4 19.8	- 4 38.4	+0.0210	0.5989	-0.1095	+25	-40
A* Scorpil	5.2	4.04	15.6	25 1.6	9 20.6	+ 0 9.7	+1.0346	0.6030	0.0959	+65	+22
B. A. C. 5253	5.8	4.03	15.4	24 14.0	9 27.7	+ 0 16.6	+0.2350	0.6031	0.0955	+35	-28
B. A. C. 5254	5.8	4.01	15.3	23 40.7	9 29.0	+ 0 17.8	-0.3185	0.6031	0.0955	+ 6	-61
3 Scorpil	6.7	4.05	15.5	24 56.7	9 44.2	+ 0 32.4	+0.9158	0.6033	0.0948	+65	+13
19 Scorpil	5.1	+4.16	-13.1	-23 55.7	19 23.0	+ 9 46.8	-0.8730	0.6101	-0.0667	-28	-90
σ Scorpil	3.4	4.20	13.3	25 21.1	19 33.8	+ 9 57.1	+0.5225	0.6103	0.0662	+51	-12
α Scorpil	1.2	4.26	12.8	26 12.6	22 33.4	-11 11.0	+1.1839	0.6120	0.0569	+64	+39
22 Scorpil	5.5	+4.22	-12.5	-24 53.7	22 52.2	-10 52.9	-0.1317	0.6122	-0.0561	+12	-49

## JULY.

25 Scorpil	7.0	+1.36	-10.8	-25 20.7	1 4 54.2	- 5 6.5	+0.0312	0.6153	-0.0373	+19	-40
18 Ophiuchi	6.7	4.37	10.6	24 27.9	5 57.6	- 4 5.8	-0.8735	0.6157	0.0340	-30	-90
B. A. C. 5709	6.3	+4.38	- 9.5	-24 56.4	9 37.8	- 0 35.2	-0.5089	0.6172	-0.0222	-11	-76
26 Ophiuchi	6.1	4.38	9.5	24 50.2	9 41.8	- 0 31.4	-0.6119	0.6172	0.0220	-16	-87
31 Ophiuchi	6.7	4.41	9.0	25 30.1	11 19.9	+ 1 2.4	+0.0112	0.6177	0.0168	+16	-41
A Ophiuchi	4.9	4.44	8.7	26 27.3	15 8.4	+ 4 40.9	+0.9062	0.6187	0.0044	+64	+13
B. A. C. 5813	6.8	4.44	8.5	26 24.1	15 27.3	+ 4 58.9	+0.8529	0.6187	0.0034	+64	+ 9
38 Ophiuchi	6.7	+4.47	- 7.8	-26 31.1	15 56.5	+ 5 26.9	+0.9664	0.6188	-0.0018	+63	+17
B. A. C. 5846	6.8	4.42	7.2	24 48.3	17 24.9	+ 6 51.5	-0.7164	0.6192	+0.0030	-23	-90
θ Ophiuchi	3.3	4.42	7.2	24 54.0	17 31.5	+ 6 57.8	-0.6214	0.6192	0.0042	-28	-88
63 Ophiuchi	6.6	4.53	3.7	24 52.0	3 5 15.9	- 5 48.8	-0.3882	0.6195	0.0416	- 3	-67
5 Sagittarii	7.0	4.52	3.1	24 16.6	7 9.9	- 3 59.8	-0.8813	0.6193	0.0477	-30	-90
7 Sagittarii	5.9	+4.53	- 2.8	-24 16.9	8 6.9	- 3 5.4	-0.8291	0.6191	+0.0507	-26	-90
9 Sagittarii	6.0	4.53	2.7	24 21.8	8 28.8	- 2 44.4	-0.7306	0.6190	0.0520	-20	-90
λ Sagittarii	2.9	4.61	- 0.2	25 28.7	17 7.0	+ 5 31.1	+0.9269	0.6167	0.0792	+65	+14
B. A. C. 6304	7.0	4.57	+ 0.5	24 11.0	19 2.4	+ 7 21.5	-0.1807	0.6159	0.0852	+12	-52
24 Sagittarii	5.9	4.57	0.5	24 6.5	19 16.7	+ 7 35.2	-0.2344	0.6158	0.0859	+ 9	-56
25 Sagittarii	6.3	+4.58	+ 0.6	-24 18.0	19 30.8	+ 7 48.7	-0.0269	0.6157	-0.0866	+20	-43
B. A. C. 6343	6.3	4.54	1.2	23 35.5	20 27.6	+ 9 11.7	-0.5902	0.6151	0.0911	- 9	-84
26 Sagittarii	6.6	4.55	1.6	23 55.7	22 10.1	+10 21.1	-0.1493	0.6146	0.0946	+14	-50
B. A. C. 6369	6.2	4.59	1.9	24 6.7	23 13.7	+11 21.9	+1.1106	0.6141	0.0979	+65	+29
14 Sagittarii	5.0	4.51	2.9	22 52.2	8 2 40.6	- 9 20.0	-0.7270	0.6123	0.1081	-15	-90
14 Sagittarii	5.1	+4.52	+ 3.0	-22 47.9	3 1.3	- 9 0.2	-0.7597	0.6121	+0.1091	-17	-90
B. A. C. 6448	6.4	4.54	3.1	23 18.2	3 20.7	- 8 41.6	-0.2307	0.6119	0.1100	+12	-55
B. A. C. 6607	5.9	4.52	5.7	22 35.5	12 28.2	+ 0 2.7	+0.1953	0.6061	0.1355	+37	-30
50 Sagittarii	5.9	4.48	6.3	21 58.7	14 36.4	+ 2 5.6	-0.1086	0.6046	0.1412	+21	-48
f Sagittarii	5.2	4.41	8.3	20 0.2	22 14.7	+ 9 25.0	-0.8908	0.5969	0.1599	-20	-90
σ Capricorni	5.6	+4.31	+11.5	-19 26.0	4 11 8.0	- 2 12.8	+0.8037	0.5877	+0.1887	+71	+ 3
π Capricorni	5.1	4.27	12.1	18 32.6	14 18.4	+ 0 50.6	+0.5371	0.5849	0.1903	+63	-11
ρ Capricorni	5.3	4.24	12.3	18 8.8	14 56.3	+ 1 26.7	+0.2696	0.5843	0.1960	+47	-27
B. A. C. 7044	7.0	4.26	12.2	18 12.4	14 59.7	+ 1 29.9	+0.3394	0.5843	0.1961	+51	-23
σ Capricorni	6.2	4.27	12.4	18 55.0	15 20.6	+ 8 49.9	+1.1084	0.5840	0.1967	+71	+25
B. A. C. 7263	5.9	+4.11	+14.6	-16 25.2	5 2 45.4	-11 11.9	+1.0049	0.5737	+0.2159	+74	+16
9 Aquarii	6.8	4.04	14.5	13 55.5	4 14.3	- 9 45.6	-1.1464	0.5723	0.2180	-31	-90
18 Aquarii	5.7	3.95	16.1	13 18.7	14 2.4	- 0 19.0	+0.4433	0.5637	0.2306	+62	-18
B. A. C. 7562	5.5	3.78	16.8	9 30.1	23 8.8	+ 8 28.0	-1.2208	0.5561	0.2397	-34	-90
41 Capricorni	5.5	3.78	16.8	9 32.8	23 10.9	+ 8 30.0	-1.1672	0.5561	0.2397	-29	-90
41 Capricorni	6.4	+3.78	+17.0	- 9 44.5	23 44.4	+ 9 2.4	-0.8372	0.5557	+0.2402	- 7	-90

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S				AT CONJUNCTION IN R. A.						Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>z</i>	<i>y</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
B. A. C. 7620	6.5	+3.77	+17.6	-10 47.3	6 3 0.0	-11 48.9	+0.9985	0.5531	+0.2428	+79	+14
36 Aquarii	6.3	3.67	18.1	8 40.9	10 10.5	- 4 53.1	+0.6449	0.5478	0.2475	+79	- 7
$\theta$ Aquarii	4.4	3.62	18.4	8 17.2	13 33.5	- 1 37.0	+1.0878	0.5454	0.2493	+82	+20
44 Aquarii	6.4	3.59	18.0	5 53.5	13 42.6	- 1 28.1	-1.2935	0.5453	0.2494	-39	-90
51 Aquarii	5.8	3.55	18.1	5 20.9	16 56.9	+ 1 39.7	-1.0351	0.5431	0.2508	-17	-90
$\kappa$ Aquarii	5.2	+3.48	+18.4	- 4 44.9	23 19.5	+ 7 49.6	-0.0394	0.5392	+0.2527	+39	-44
B. A. C. 7951 ( <i>mean</i> )	6.7	3.43	18.8	- 4 45.2	7 4 5.4	-11 33.8	+1.1728	0.5365	0.2536	+85	+26
$\kappa$ Piscium	4.7	3.21	18.6	+ 0 42.1	22 57.1	+ 6 41.9	+0.3647	0.5280	0.2521	+63	-22
9 Piscium	6.6	3.21	18.7	0 34.0	23 6.4	+ 6 50.9	+0.5433	0.5279	0.2520	+75	-13
16 Piscium	5.8	3.14	18.6	1 32.3	8 3 36.0	+11 12.1	+0.6094	0.5265	0.2506	+88	- 6
19 Piscium	4.9	+3.09	+18.2	+ 2 55.6	8 31.6	- 8 1.5	+0.4610	0.5256	+0.2486	+69	-17
36 Piscium	6.3	2.94	17.2	7 40.7	23 30.1	+ 6 29.4	-0.8456	0.5224	0.2398	- 3	-82
$d$ Piscium	5.3	2.92	17.2	7 37.7	9 1 30.6	+ 8 26.1	-0.3135	0.5222	0.2384	+25	-58
45 Piscium	6.9	2.90	17.4	7 7.9	4 3.2	+10 54.1	+0.8128	0.5221	0.2364	+90	+ 3
58 Piscium	5.0	2.80	15.9	11 25.3	14 41.0	- 2 47.7	-1.2571	0.5219	0.2272	-36	-79
75 Piscium	6.0	+2.72	+15.5	+12 24.8	10 0 25.0	+ 6 38.5	-0.1520	0.5225	+0.2172	+33	-46
$\eta$ Piscium	3.7	2.63	14.5	14 49.4	12 45.9	- 5 23.4	-0.1395	0.5242	0.2025	+34	-43
101 Piscium	6.3	2.60	14.5	14 8.7	14 53.4	- 3 19.9	+1.0193	0.5246	0.1998	+90	+21
103 Piscium	6.8	2.59	13.8	16 6.7	16 35.4	- 1 41.1	-0.7599	0.5247	0.1975	0	-71
105 Piscium	6.3	2.60	13.9	15 53.5	16 47.9	- 1 25.9	-0.4825	0.5249	0.1973	+15	-62
3 Arietis	6.0	+2.58	+13.4	+16 54.3	20 11.4	+ 1 48.3	-0.9139	0.5257	+0.1926	-10	-73
4 Arietis	5.7	2.57	13.6	16 27.1	20 58.7	+ 2 34.1	-0.2735	0.5258	0.1916	+26	-49
$\epsilon$ Arietis	5.7	2.53	13.1	17 19.4	11 1 27.9	+ 6 54.8	-0.3701	0.5269	0.1852	+21	-54
15 Arietis	5.7	2.49	12.3	19 1.3	7 55.2	-10 50.0	-1.0480	0.5285	0.1755	-20	-71
B. A. C. 686	7.2	2.48	12.2	19 8.6	9 29.7	- 9 18.4	-0.9047	0.5289	0.1731	-10	-71
$\theta$ Arietis	5.7	+2.46	+12.0	+19 26.0	11 33.7	- 7 18.3	-0.8656	0.5294	+0.1698	- 7	-71
23 Arietis	7.5	2.46	12.0	19 13.5	12 3.5	- 6 49.5	-0.5556	0.5296	0.1690	+11	-63
26 Arietis	6.0	2.42	11.7	19 24.3	17 36.1	- 1 27.4	+0.1586	0.5312	0.1600	+51	-22
$\mu$ Arietis	6.0	2.39	11.2	19 34.8	23 14.1	+ 3 59.8	+0.8446	0.5328	0.1504	+90	+16
47 Arietis	6.0	2.34	10.6	20 15.8	12 6 42.7	+11 14.1	+1.1764	0.5351	0.1371	+90	+42
$\epsilon$ Arietis	4.6	+2.34	+10.3	+20 56.1	7 15.0	+11 45.3	+0.5135	0.5352	+0.1361	+76	- 1
66 Arietis	6.0	2.25	9.0	22 27.3	21 0.6	+ 1 4.0	+0.5437	0.5392	0.1099	+79	+ 3
7 Tauri	6.0	2.25	8.3	24 7.5	23 47.2	+ 3 45.2	-0.9960	0.5400	0.1044	-18	-66
9 Tauri	7.0	2.22	8.6	22 52.5	18 0 59.3	+ 4 54.9	+0.5027	0.5403	0.1020	+75	+ 2
$g$ Pleiadum	6.3	2.21	8.0	23 58.2	4 37.0	+ 8 25.5	-0.3469	0.5413	0.0946	+22	-43
17 Tauri	4.3	+2.21	+ 8.0	+23 47.7	4 39.2	+ 8 27.6	-0.1495	0.5413	+0.0945	+33	-32
18 Tauri	6.3	2.22	7.8	24 31.3	4 40.4	+ 8 34.5	-0.9371	0.5413	0.0943	-15	-65
19 Tauri	5.0	2.21	7.9	24 9.0	4 48.1	+ 8 36.2	-0.5263	0.5413	0.0942	+12	-54
20 Tauri	5.0	2.21	7.9	24 3.1	5 5.5	+ 8 52.9	-0.3908	0.5415	0.0936	+19	-45
21 Tauri	7.0	2.21	7.9	24 14.3	5 7.6	+ 8 55.0	-0.5937	0.5415	0.0936	+ 8	-58
22 Tauri	7.0	+2.21	+ 7.9	+24 12.7	5 11.6	+ 8 58.9	-0.5581	0.5415	+0.0934	+10	-56
23 Tauri	4.7	2.21	8.0	23 38.0	5 19.9	+ 9 6.9	+0.0927	0.5415	0.0931	+47	-19
$\eta$ Tauri	3.1	2.20	8.0	23 47.5	5 52.0	+ 9 38.0	-0.0332	0.5416	0.0921	+40	-25
B. A. C. 1170	6.3	2.19	8.1	23 6.6	6 16.8	+10 1.9	+0.7566	0.5417	0.0912	+90	+17
26 Tauri	7.0	2.20	8.0	23 32.8	6 33.0	+10 17.5	+0.2998	0.5418	0.0908	+60	- 7
27 Tauri	4.0	+2.20	+ 7.9	+23 44.6	6 38.8	+10 23.2	+0.0912	0.5418	+0.0904	+47	-18
28 Tauri	6.2	2.20	7.9	23 49.6	6 39.4	+10 23.8	+0.0002	0.5418	0.0904	+41	-23
36 Tauri	6.0	2.15	7.4	23 49.6	13 41.2	- 6 48.5	+0.5846	0.5434	0.0757	+83	+ 9
$\chi$ Tauri	5.7	2.12	6.3	25 23.4	22 2.9	+ 1 16.5	-0.5859	0.5450	0.0577	+ 8	-55
62 Tauri	6.0	2.10	6.6	24 3.9	22 43.6	+ 1 55.9	+0.9194	0.5452	0.0562	+90	+31
$k$ Tauri	6.0	+2.02	+ 5.0	+24 53.6	14 14 21.6	- 6 57.6	+0.6120	0.5470	+0.0216	+87	+16
118 Tauri	5.7	1.95	3.7	25 4.1	15 4 35.2	+ 6 47.3	+0.4988	0.5472	-0.0104	+76	+11
125 Tauri	6.0	1.94	3.1	25 50.4	9 21.6	+11 24.0	-0.4341	0.5470	0.0211	+17	-41
132 Tauri	5.3	1.91	3.0	24 32.0	13 38.9	- 8 27.4	+0.9071	0.5466	0.0306	+90	+32
139 Tauri	5.3	1.91	2.4	25 56.5	17 44.7	- 4 29.8	-0.8018	0.5461	0.0395	- 6	-64
5 Geminorum	6.7	+1.87	+ 2.0	+24 26.6	16 0 1.6	+ 1 34.5	+0.5718	0.5451	-0.0535	+82	+11

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.											
JULY.											
THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x</i>	<i>y</i>	N.	S.
		<i>Δα</i>	<i>Δδ</i>								
8 Geminorum	6.5	+1.85	+ 1.8	+24 0.2	16 2 14.9	+ 3 43.4	+0.9367	0.5446	-0.0583	+90	+32
9 Geminorum	6.3	+1.85	+ 1.8	23 46.5	2 33.6	+ 4 1.4	+1.1712	0.5446	0.0590	+90	+50
ω Geminorum	5.7	+1.81	- 0.2	24 21.6	23 49.0	+ 0 34.9	-1.2072	0.5390	0.1030	-39	-66
44 Geminorum	6.0	+1.78	- 0.2	+22 47.4	17 1 13.4	+ 1 56.6	+0.3914	0.5386	-0.1058	+66	- 5
NEW MOON.											
ξ Leonis	5.3	+1.70	- 7.1	+11 45.0	20 2 39.0	+ 1 7.0	+0.3733	0.5125	-0.2139	+63	-18
ο Leonis	3.8	+1.71	7.6	10 21.3	7 30.3	+ 5 49.8	+0.8523	0.5112	0.2183	+90	+ 8
10 Sextantis	6.0	+1.73	8.4	9 24.8	15 34.9	-10 19.5	+0.0897	0.5095	0.2248	+46	-34
11 Sextantis	6.0	+1.73	8.6	8 47.9	16 28.8	- 9 27.2	+0.5598	0.5093	0.2255	+77	-10
π Leonis	5.0	+1.73	- 8.7	+ 8 31.9	17 35.5	- 8 22.4	+0.6005	0.5090	-0.2262	+81	- 8
43 Leonis	6.5	+1.78	9.8	7 3.5	21 5 43.7	+ 3 24.8	-0.5876	0.5075	0.2338	+11	-76
34 Sextantis	6.7	+1.81	11.2	4 6.8	16 13.1	-10 23.7	+0.1319	0.5070	0.2385	+49	-34
35 <sup>1</sup> Sextantis	6.2	+1.82	11.0	5 16.7	16 34.9	-10 2.5	-1.2180	0.5070	0.2387	-30	-85
36 Sextantis	6.6	+1.81	11.5	3 1.3	17 34.4	- 9 4.7	+0.9908	0.5070	0.2390	+90	+13
ρ <sup>8</sup> Leonis	5.4	+1.86	-12.7	+ 0 32.7	22 3 24.9	+ 0 29.0	+1.2978	0.5075	-0.2417	+90	+38
ρ <sup>8</sup> Leonis	6.2	+1.87	12.3	2 30.3	5 10.4	+ 2 11.4	-1.2435	0.5077	0.2421	-33	-87
ρ <sup>6</sup> Leonis	5.7	+1.90	13.0	+ 0 28.9	8 48.1	+ 5 42.9	+0.0595	0.5082	0.2425	+45	-38
ε Leonis	5.3	+1.96	14.1	- 2 26.7	17 33.1	- 9 47.2	+1.0782	0.5101	0.2430	+88	+19
B. A. C. 4006	6.1	+2.05	15.2	4 46.2	22 4 23.3	+ 0 44.0	+0.9357	0.5128	0.2418	+85	+ 9
γ Virginis	5.7	+2.26	-16.9	- 8 53.7	24 2 10.9	- 2 7.4	+0.1221	0.5223	-0.2332	+46	-35
69 Virginis	5.0	+2.61	18.0	15 27.0	25 4 6.8	- 1 0.8	+1.2090	0.5393	0.2110	+75	+32
75 Virginis	6.0	+2.64	18.6	14 50.6	6 38.1	+ 1 25.5	+0.0472	0.5413	0.2081	+38	-39
83 Virginis	6.0	+2.74	18.7	15 40.3	11 58.8	+ 6 35.5	-0.1861	0.5457	0.2014	+25	-52
85 Virginis	6.5	+2.74	18.5	15 15.6	12 29.0	+ 7 4.6	-0.7145	0.5461	0.2008	- 3	-90
87 Virginis	5.8	+2.77	-19.4	-17 21.3	13 17.8	+ 7 51.8	+1.2967	0.5467	-0.1996	+73	+45
B. A. C. 4722	5.8	+2.98	18.5	17 43.8	26 1 46.8	- 4 5.0	-0.6971	0.5574	0.1810	- 5	-90
42 Libræ	5.7	+3.74	16.1	23 29.5	27 12 51.0	+ 5 40.4	+0.0422	0.5882	0.1076	+26	-39
A <sup>3</sup> Scorpii	5.2	+3.87	15.6	25 1.6	18 2.0	+10 39.1	+1.0684	0.5922	0.0942	+65	+25
B. A. C. 5253	5.8	+3.85	15.3	24 14.0	18 9.4	+10 46.2	+0.2563	0.5924	0.0939	+36	-28
B. A. C. 5254	5.8	+3.84	-15.1	-23 40.7	18 10.7	+10 47.4	-0.3053	0.5924	-0.0938	+ 6	-60
3 Scorpii	6.7	+3.88	15.5	24 56.7	18 26.4	+11 2.5	+0.6477	0.5926	0.0931	+65	+15
19 Scorpii	5.1	+4.03	13.1	23 55.7	28 4 24.7	- 3 23.6	-0.8693	0.5996	0.0656	-27	-90
σ Scorpii	3.4	+4.06	13.5	25 21.1	4 35.9	- 3 12.8	-0.5473	0.5997	0.0651	+52	-10
α Scorpii	1.2	+4.12	13.0	26 12.6	7 41.3	- 0 15.1	+1.2183	0.6016	0.0562	+64	+44
22 Scorpii	5.5	+4.12	-12.6	-24 53.7	8 0.7	+ 0 3.5	-0.1170	0.6018	-0.0552	+13	-48
25 Scorpii	7.0	+4.23	11.1	25 20.7	14 14.3	+ 6 1.5	+0.0476	0.6051	0.0368	+20	-38
18 Ophiuchi	6.7	+4.25	10.9	24 27.9	15 19.6	+ 7 4.1	-0.8700	0.6055	0.0335	-30	-90
B. A. C. 5709	6.3	+4.29	9.8	24 56.4	19 6.7	+10 41.6	-0.5007	0.6071	0.0220	-10	-75
26 Ophiuchi	6.1	+4.29	9.7	24 50.2	19 10.9	+10 45.6	-0.6052	0.6073	0.0218	-16	-86
31 Ophiuchi	6.7	+4.33	- 9.4	-25 30.1	20 51.8	-11 37.8	+0.0263	0.6080	-0.0167	+17	-40
A Ophiuchi	4.9	+4.40	9.3	26 27.3	20 0 47.1	- 7 52.4	+0.9325	0.6093	0.0045	+64	+15
B. A. C. 5813	6.8	+4.40	9.2	26 24.1	1 6.4	- 7 33.9	+0.8785	0.6094	0.0035	+64	+11
38 Ophiuchi	6.7	+4.43	8.5	26 31.2	1 36.5	- 7 5.0	+0.9932	0.6095	-0.0020	+63	+20
B. A. C. 5846	6.8	+4.39	7.6	24 48.3	3 7.4	- 5 38.0	-0.7101	0.6099	+0.0027	-23	-90
θ Ophiuchi	3.3	+4.40	- 7.6	-24 54.0	3 14.3	- 5 31.5	-0.6154	0.6100	+0.0031	-18	-87
63 Ophiuchi	6.6	+4.57	4.0	24 52.0	15 17.2	+ 6 0.6	-0.3823	0.6116	0.0408	- 2	-66
5 Sagittarii	7.0	+4.57	3.3	24 16.6	17 13.9	+ 7 52.3	-0.8799	0.6116	0.0469	-30	-90
7 Sagittarii	5.9	+4.57	3.1	24 16.9	18 12.3	+ 8 48.2	-0.8271	0.6115	0.0499	-26	-90
9 Sagittarii	6.0	+4.58	3.0	24 21.8	18 34.7	+ 9 9.7	-0.7276	0.6115	0.0511	-20	-90
λ Sagittarii	2.9	+4.72	- 0.7	-25 28.7	30 3 24.4	- 6 23.3	+0.9445	0.6104	+0.0782	+65	+15
B. A. C. 6304	7.0	+4.69	+ 0.2	24 11.0	5 21.7	- 4 31.0	-0.1742	0.6098	0.0841	+13	-52
24 Sagittarii	5.9	+4.69	0.3	24 6.5	5 36.2	- 4 17.2	-0.2287	0.6098	0.0848	+10	-55
25 Sagittarii	6.3	+4.70	0.4	24 18.0	5 50.6	- 4 3.3	-0.0193	0.6097	0.0855	+21	-42
B. A. C. 6343	6.3	+4.68	1.1	23 35.5	7 19.1	- 2 38.6	-0.5879	0.6093	0.0899	- 9	-84
26 Sagittarii	6.6	+4.70	+ 1.4	-23 55.7	8 32.8	- 1 28.0	-0.1436	0.6090	+0.0935	+15	-50



ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

JULY.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	X	Y	N.	S.
		Δα	Δδ		d h m	h m					
B. A. C. 6369	6.2	+4.75	+ 1.6	-25 6.7	30 9 37.6	- 0 26.0	+1.1265	0.6086	+0.0967	+65	+31
♄ Sagittarii	5.0	4.70	2.9	22 52.2	13 7.8	+ 2 55.4	-0.7266	0.6073	0.1069	-15	-90
♄ Sagittarii	5.1	4.70	3.0	22 47.9	13 28.9	+ 3 15.5	-0.7595	0.6072	0.1079	-17	-90
B. A. C. 6448	6.4	4.72	3.1	23 18.3	13 48.6	+ 3 34.5	-0.2267	0.6070	0.1089	+12	-55
B. A. C. 6607	5.9	4.74	5.9	22 35.5	23 3.3	-11 34.0	+0.1989	0.6028	0.1344	+37	-30
♄ Sagittarii	5.9	+4.73	+ 6.6	-21 58.6	81 1 12.9	- 9 29.7	-0.1090	0.6015	+0.1401	+21	-48
♄ Sagittarii	5.2	4.70	9.0	20 0.2	8 55.1	- 2 6.4	-0.8951	0.5970	0.1595	-20	-90
♄ Sagittarii	6.1	4.67	9.8	19 18.1	11 10.9	+ 0 3.8	-1.2192	0.5955	0.1649	-45	-90
♄ Capricorni	5.6	+4.69	+12.6	-19 26.0	21 50.9	+10 18.4	+0.7977	0.5880	+0.1883	+71	+ 3

AUGUST.

♄ Capricorni	5.1	+4.66	+13.4	-18 32.5	1 1 1.6	-10 38.4	+0.5290	0.5857	+0.1947	+62	-13
♄ Capricorni	5.3	4.65	13.6	18 8.8	1 39.1	-10 2.3	+0.2614	0.5852	0.1959	+47	-27
B. A. C. 7044	7.0	+4.65	+13.5	-18 12.4	1 42.5	- 9 59.1	+0.3312	0.5852	+0.1960	+51	-23
♄ Capricorni	6.2	4.67	13.6	18 55.0	2 3.4	- 9 39.1	+1.0999	0.5849	0.1966	+71	+24
B. A. C. 7263	5.9	4.56	16.5	16 25.2	13 25.2	+ 1 16.7	+0.9886	0.5763	0.2164	+74	+15
♄ Aquarii	6.8	4.53	16.8	13 55.5	14 53.4	+ 2 41.5	-1.1578	0.5750	0.2186	-32	-90
♄ Aquarii	5.7	4.45	18.7	13 18.6	2 0 35.8	-11 57.5	+0.4217	0.5678	0.2318	+61	-19
B. A. C. 7562	5.5	+4.32	+20.1	- 9 30.0	9 34.6	- 3 18.1	-1.2385	0.5613	+0.2414	-36	-90
♄ Capricorni	5.5	4.32	20.2	9 32.7	9 36.8	- 3 16.0	-1.1845	0.5613	0.2415	-31	-90
♄ Capricorni	6.4	4.32	20.3	9 44.5	10 9.8	- 2 44.1	-0.8569	0.5609	0.2420	- 8	-90
♄ Capricorni	5.7	4.36	20.4	11 49.9	10 15.5	- 2 38.6	+1.2468	0.5609	0.2421	+78	+35
B. A. C. 7620	6.5	4.32	20.8	10 47.2	13 22.2	+ 0 21.4	+0.9651	0.5587	0.2448	+79	+12
♄ Aquarii	6.3	+4.25	+21.7	- 8 40.9	20 24.9	+ 7 9.4	+0.6089	0.5540	+0.2499	+77	- 9
♄ Aquarii	4.4	4.23	22.1	8 17.1	23 43.9	+10 21.5	+1.0459	0.5520	0.2518	+82	+17
♄ Aquarii	6.4	4.20	21.9	5 53.4	23 52.9	+10 30.2	-1.3151	0.5519	0.2519	-42	-90
♄ Aquarii	5.8	4.16	22.2	5 20.8	8 3 3.1	-10 26.0	-1.0607	0.5500	0.2534	-19	-90
♄ Aquarii	5.2	4.10	22.7	4 44.9	9 17.3	- 4 24.5	-0.0769	0.5465	0.2557	+37	-46
B.A.C. 7951 (mean)	6.7	+4.05	+23.1	- 4 45.1	13 56.6	+ 0 5.5	+1.1209	0.5441	+0.2567	+85	+22
♄ Piscium	4.7	3.90	23.6	+ 0 42.2	4 8 19.2	- 6 8.0	+1.3105	0.5364	0.2556	+59	-25
♄ Piscium	6.6	3.90	23.6	0 34.1	8 28.3	- 5 59.2	+0.4872	0.5363	0.2556	+71	-16
15 Piscium	6.6	3.87	23.7	0 45.4	12 24.0	- 2 11.2	+1.2991	0.5351	0.2543	+90	+39
16 Piscium	5.8	3.86	23.6	1 32.4	12 50.5	- 1 45.5	+0.6092	0.5349	0.2541	+81	- 9
19 Piscium	4.9	+3.82	+23.4	+ 2 55.6	17 37.9	+ 2 52.7	+0.4007	0.5336	+0.2521	+65	-20
36 Piscium	6.3	3.71	22.6	7 40.8	5 8 11.5	- 7 1.4	-0.8985	0.5308	0.2432	- 8	-82
♄ Piscium	5.3	3.70	22.7	7 37.8	10 8.7	- 5 7.8	-0.3708	0.5305	0.2417	+22	-61
45 Piscium	6.9	3.68	22.8	7 8.0	12 37.0	- 2 44.2	+0.7401	0.5302	0.2397	+90	- 1
58 Piscium	5.0	3.62	21.4	11 25.4	22 57.4	+ 7 16.6	-1.3081	0.5296	0.2302	-42	-79
75 Piscium	6.0	+3.55	+20.9	+12 24.9	6 8 26.4	- 7 32.4	-0.2188	0.5297	+0.2199	+29	-49
♄ Piscium	3.7	3.48	19.7	14 49.5	20 29.2	+ 4 7.6	-0.2099	0.5307	0.2048	+30	-47
101 Piscium	6.3	3.46	19.6	14 8.7	22 33.9	+ 6 8.3	+0.9359	0.5309	0.2020	+90	+16
103 Piscium	6.8	3.46	18.9	16 6.8	7 0 13.5	+ 7 44.7	-0.8241	0.5311	0.1997	- 4	-74
105 Piscium	6.3	3.46	18.9	15 53.6	0 25.7	+ 7 56.6	-0.5499	0.5312	0.1994	+12	-67
3 Arietis	6.0	+3.44	+18.4	+16 54.4	3 44.7	+11 9.3	-0.9775	0.5317	+0.1946	-14	-73
4 Arietis	5.7	3.44	18.5	16 27.2	4 31.0	+11 54.1	-0.3440	0.5318	0.1935	+23	-53
♄ Arietis	5.7	3.41	18.0	17 19.5	8 54.6	- 7 50.7	-0.4402	0.5324	0.1870	+19	-58
15 Arietis	5.7	3.38	17.0	19 1.4	15 14.2	- 1 43.3	-1.1125	0.5336	0.1771	-25	-71
B. A. C. 686	7.2	3.37	16.8	19 8.6	16 46.9	- 0 13.5	+0.9710	0.5338	0.1746	-15	-71
♄ Arietis	5.7	+3.36	+16.6	+19 26.0	18 48.7	+ 1 44.4	-0.9327	0.5343	+0.1712	-12	-71
23 Arietis	7.5	3.35	16.6	19 13.5	19 17.9	+ 2 12.6	-0.6256	0.5343	0.1704	+ 7	-67
26 Arietis	6.0	3.32	16.1	19 24.4	8 0 44.8	+ 7 28.9	+0.0818	0.5354	0.1612	+46	-26
♄ Arietis	6.0	3.29	15.6	19 34.8	6 17.4	-11 9.3	+0.7618	0.5366	0.1514	+90	+11
47 Arietis	6.0	3.25	14.7	20 15.8	13 39.6	- 4 1.5	+1.0917	0.5382	0.1379	+90	+35
♄ Arietis	4.6	+3.25	+14.4	+20 56.2	14 11.5	- 3 30.7	+0.4343	0.5383	+0.1369	+69	- 5

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	$\gamma$	$\alpha$	$\delta$	N.	S.		
		$\Delta\alpha$	$\Delta\delta$		d h m	h m							
66 Arietis	6.0	+3.16	+12.4	+22 7.3	9 3 47.7	+ 9 38.6	+0.4658	0.5412	+0.1104	+72	- 1		
7 Tauri	6.0	3.16	11.5	24 7.5	6 32.7	-11 41.8	-1.0630	0.5417	0.1048	-24	-66		
9 Tauri	7.0	3.13	11.6	22 52.6	7 44.1	-10 32.8	+0.4256	0.5420	0.1001	+69	- 2		
g Pleiadum	6.3	3.11	10.7	23 58.3	11 20.0	- 7 4.0	-0.4182	0.5427	0.0950	+18	-47		
17 Tauri	4.3	3.11	10.8	23 47.7	11 22.2	- 7 1.9	-0.2219	0.5427	0.0949	+29	-35		
18 Tauri	6.3	+3.12	+10.5	+24 31.3	11 29.4	- 6 55.0	-1.0065	0.5427	+0.0946	-20	-65		
19 Tauri	5.0	3.12	10.7	24 9.0	11 31.0	- 6 53.4	-0.5965	0.5427	0.0946	+ 8	-59		
20 Tauri	5.0	3.11	10.7	24 3.1	11 48.2	- 6 36.9	-0.4619	0.5428	0.0939	+15	-50		
21 Tauri	7.0	3.12	10.6	24 14.3	11 50.3	- 6 34.8	-0.6635	0.5428	0.0939	+ 4	-63		
22 Tauri	7.0	3.12	10.6	24 12.7	11 54.3	- 6 30.9	-0.6281	0.5428	0.0938	+ 6	-61		
23 Tauri	4.7	+3.10	+10.8	+23 38.0	12 2.5	- 6 23.0	+0.0189	0.5428	+0.0935	+42	-22		
7 Tauri	3.1	3.10	10.7	23 47.6	12 34.4	- 5 52.1	-0.1061	0.5429	0.0924	+35	-29		
B. A. C. 1170	6.3	3.09	10.9	23 6.6	12 59.0	- 5 28.4	-0.0679	0.5430	0.0915	+90	+13		
26 Tauri	7.0	3.09	11.0	23 32.8	13 15.1	- 5 12.8	+0.2249	0.5430	0.0910	+55	-11		
27 Tauri	4.0	3.10	10.6	23 44.7	13 20.9	- 5 7.2	+1.0175	0.5430	0.0907	+42	-22		
28 Tauri	6.2	+3.10	+10.6	+23 49.7	13 21.4	- 5 6.7	-0.0729	0.5430	+0.0907	+37	-27		
33 Tauri	6.3	3.05	10.5	22 52.9	17 0.1	- 1 35.3	+1.2819	0.5435	0.0830	+90	+62		
36 Tauri	6.0	3.04	9.8	23 49.7	20 20.3	+ 1 38.1	+0.5104	0.5442	0.0759	+76	+ 5		
χ Tauri	5.7	2.99	8.2	25 23.4	10 4 39.5	+ 9 40.7	-0.6531	0.5453	0.0580	+ 4	-60		
62 Tauri	6.0	2.96	8.6	24 3.9	5 20.0	+10 19.9	+0.8457	0.5453	0.0565	+90	+26		
4 Tauri	6.0	+2.86	+ 6.3	+24 53.7	20 55.1	+ 1 23.4	+0.5447	0.5464	+0.0219	+80	+12		
118 Tauri	5.7	2.74	4.4	25 4.1	11 11 7.8	- 8 52.7	+0.4376	0.5462	-0.0100	+70	+ 8		
125 Tauri	6.0	2.71	3.5	25 50.4	15 54.2	- 4 15.9	-0.4909	0.5458	0.0206	+13	-45		
132 Tauri	5.3	2.65	3.4	24 32.0	20 11.5	- 0 7.3	+0.8490	0.5454	0.0301	+90	+29		
139 Tauri	5.3	2.65	2.4	25 56.5	12 0 17.3	+ 3 50.3	-0.8539	0.5449	0.0391	- 9	-64		
5 Geminorum	6.7	+2.57	+ 2.0	+24 26.6	6 34.4	+ 9 54.9	+0.5197	0.5439	-0.0528	+77	+ 8		
8 Geminorum	6.5	2.55	1.8	24 0.2	8 47.7	-11 56.3	+0.8851	0.5435	0.0576	+90	+28		
9 Geminorum	6.3	2.54	1.9	23 46.5	9 6.4	-11 38.2	+1.1194	0.5434	0.0583	+90	+45		
10 Geminorum	7.0	2.53	+ 1.8	23 38.5	10 0.1	-10 46.2	+1.2154	0.5433	0.0602	+86	+55		
ω Geminorum	5.7	2.39	- 0.9	24 21.6	13 6 22.1	+ 8 55.5	-1.2415	0.5383	0.1022	-45	-66		
44 Geminorum	6.0	+2.36	- 0.8	+22 47.4	7 46.4	+10 17.1	+0.3541	0.5379	-0.1049	+64	- 6		
δ Geminorum	3.5	2.30	1.5	22 10.2	14 50.8	- 6 52.2	+0.2505	0.5357	0.1185	+56	-13		
58 Geminorum	6.3	2.31	1.9	23 8.5	16 25.8	- 5 20.2	-1.0157	0.5353	0.1215	-20	-67		
63 Geminorum	5.7	2.27	1.9	21 39.2	18 30.9	- 3 19.2	+0.3749	0.5346	0.1254	+65	- 7		
79 Geminorum	6.3	2.20	2.6	20 33.6	14 2 57.1	+ 4 51.0	+0.4617	0.5319	0.1405	+71	- 5		
85 Geminorum	6.0	+2.17	- 3.1	+20 9.2	8 5.4	+ 9 49.6	+0.1679	0.5301	-0.1492	+51	-21		
α Cancri	6.0	2.08	4.5	18 39.5	21 48.6	- 0 52.7	-0.3844	0.5255	0.1709	+20	-53		
θ Cancri	5.7	2.06	4.8	18 26.3	15 1 55.9	+ 3 6.9	-0.8546	0.5242	0.1769	- 7	-72		
NEW MOON.													
♌ Leonis	6.2	1.82	11.4	2 30.4	18 10 51.6	+ 9 40.0	-1.1573	0.5116	0.2429	-25	-87		
♊ Leonis	5.7	+1.84	-11.8	+ 0 28.9	14 27.1	-10 50.7	+0.1457	0.5120	-0.2434	+49	-33		
MERCURY				+ 0 23.5	20 50.8	- 4 38.3	-1.3138	0.5028	0.2317	-42	-90		
ε Leonis	5.3	1.85	12.6	- 2 26.6	23 7.0	- 2 26.0	+1.1713	0.5135	0.2437	+88	+26		
B. A. C. 4006	6.1	1.90	13.6	4 46.2	19 9 51.9	+ 8 0.0	+1.0391	0.5161	0.2424	+85	+15		
γ Virginis	5.7	2.03	15.0	8 53.6	20 7 32.4	+ 5 1.3	+0.2453	0.5243	0.2333	+53	-28		
69 Virginis	5.0	+2.30	-16.8	-15 27.0	21 9 30.5	+ 6 10.3	+1.3510	0.5390	-0.2103	+75	+55		
75 Virginis	6.0	2.34	16.6	14 50.6	12 2.7	+ 8 37.5	+0.1854	0.5407	0.2073	+46	-31		
83 Virginis	6.0	2.42	16.8	15 40.3	17 25.7	-10 10.2	-0.0469	0.5444	0.2005	+32	-44		
85 Virginis	6.5	2.42	16.7	15 15.6	17 56.1	- 9 40.9	-0.5778	0.5448	0.1998	+ 4	-79		
B. A. C. 4722	5.8	2.62	16.7	17 43.8	22 7 22.8	+ 3 18.3	-0.5588	0.5454	0.1797	+ 3	-79		
42 Libræ	5.7	+3.32	-15.1	-23 29.2	23 19 9.0	-10 14.2	+0.1837	0.5804	-0.1063	+34	-31		
♏ Scorpii	5.2	3.45	14.8	25 1.6	24 0 28.3	- 5 7.1	+1.2218	0.5845	0.0931	+65	+43		
B. A. C. 5253	5.8	3.44	14.5	24 14.0	0 35.9	- 4 59.7	-0.3987	0.5846	0.0928	+45	-19		
B. A. C. 5254	5.8	3.43	14.3	23 40.7	0 37.3	- 4 58.5	-0.1698	0.5846	0.0927	+14	-51		
3 Scorpii	6.7	3.46	14.7	24 56.7	0 53.5	- 4 42.9	+1.0995	0.5847	0.0921	+65	+28		
19 Scorpii	5.1	+3.63	-12.5	-23 55.7	24 11 9.1	+ 5 8.4	-0.7455	0.5907	-0.0650	-20	-90		

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

AUGUST.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
$\sigma$ Scorpii	3.4	+3.66	-13.0	-25 21.1	24 11 20.6	+ 5 19.5	+0.6916	0.5908	-0.0645	+63	- 1
$\alpha$ Scorpii	1.2	3.74	12.7	26 12.6	14 32.1	+ 8 23.3	+1.2002	0.5924	0.0557	+64	+41
22 Scorpii	5.5	3.72	12.1	24 53.7	14 51.8	+ 8 42.2	+0.0153	0.5926	0.0548	+20	-40
25 Scorpii	7.0	3.86	10.9	25 20.7	21 17.1	- 9 8.0	+0.1795	0.5954	0.0367	+27	-31
18 Ophiuchi	6.7	3.88	10.7	24 27.9	22 24.6	- 8 3.2	-0.7523	0.5957	0.0334	-23	-90
B. A. C. 5709	6.3	+3.94	- 9.6	-24 56.4	25 2 19.1	- 4 18.3	-0.3800	0.5973	-0.0222	- 4	-66
26 Ophiuchi	6.1	3.94	9.6	24 50.2	2 23.4	- 4 14.2	-0.4861	0.5973	0.0220	- 9	-74
31 Ophiuchi	6.7	3.99	9.4	25 30.1	4 7.7	- 2 34.1	+0.1538	0.5979	0.0169	+24	-32
A Ophiuchi	4.9	4.06	9.5	26 27.3	8 10.9	+ 1 19.0	+0.10713	0.5990	0.0050	+64	+26
B. A. C. 5813	6.8	4.07	9.4	26 24.1	8 30.9	+ 1 38.2	+1.0163	0.5991	0.0041	+64	+22
38 Ophiuchi	6.7	+4.09	- 8.6	-26 31.2	9 2.0	+ 2 8.1	+1.1335	0.5992	-0.0025	+63	+33
39 Ophiuchi ( <i>S.star</i> )	6.0	4.03	7.8	24 10.7	9 12.8	+ 2 18.4	-1.2310	0.5993	0.0020	-61	-90
B. A. C. 5846	6.8	4.08	7.7	24 48.3	10 36.0	+ 3 38.2	-0.5979	0.5996	-0.0021	-17	-85
$\theta$ Ophiuchi	3.3	4.08	7.7	24 54.0	10 43.0	+ 3 45.0	-0.5010	0.5996	+0.0024	-12	-75
B. A. C. 5868	7.0	4.08	7.1	24 9.1	11 54.2	+ 4 53.2	-1.2501	0.5998	0.0059	-63	-90
63 Ophiuchi	6.6	+4.29	- 4.3	-24 52.0	23 10.8	- 8 18.1	-0.2741	0.6010	+0.0393	+ 4	-58
B. A. C. 6066	7.3	4.27	3.8	23 55.5	26 0 2.2	- 7 28.8	-1.1843	0.6009	0.0418	-54	-90
4 Sagittarii	5.4	4.28	3.5	23 48.5	1 2.9	- 6 30.6	-1.2587	0.6009	0.0448	-62	-90
5 Sagittarii	7.0	4.30	3.6	24 16.6	1 11.5	- 6 22.3	-0.7810	0.6010	0.0452	-24	-90
7 Sagittarii	5.9	4.31	3.4	24 16.9	2 11.9	- 5 24.4	-0.7282	0.6009	0.0482	-20	-90
9 Sagittarii	6.0	+4.32	- 3.3	-24 21.8	2 35.0	- 5 2.3	-0.6275	0.6009	+0.0493	-14	-89
B. A. C. 6161	5.7	4.35	2.3	23 43.4	5 34.1	- 2 10.6	-1.1096	0.6007	0.0586	-45	-90
$\lambda$ Sagittarii	2.9	4.47	1.3	25 28.7	11 42.2	+ 3 42.5	+1.0611	0.5999	0.0759	+65	+25
B. A. C. 6304	7.0	4.47	0.2	24 11.0	13 44.1	+ 5 39.4	-0.0752	0.5995	0.0817	+17	-46
24 Sagittarii	5.9	4.47	0.1	24 6.5	13 59.1	+ 5 53.6	-0.1308	0.5994	0.0824	+15	-49
25 Sagittarii	6.3	+4.48	- 0.1	-24 18.0	14 14.0	+ 6 7.9	+0.0816	0.5994	+0.0831	+26	-36
B. A. C. 6343	6.3	4.48	+ 0.6	23 35.5	15 45.7	+ 7 35.9	-0.4966	0.5990	0.0874	- 4	-75
26 Sagittarii	6.6	4.51	0.9	23 55.7	17 1.5	+ 8 48.6	-0.0473	0.5987	0.0909	+20	-44
$\mu$ Sagittarii	5.0	4.53	2.5	22 52.2	21 45.5	-10 39.0	-0.6437	0.5973	0.1041	-10	-90
$\nu$ Sagittarii	5.1	4.53	2.6	22 47.9	22 7.3	-10 18.2	-0.6775	0.5973	0.1051	-12	-90
B. A. C. 6448	6.4	+4.55	+ 2.6	-23 18.3	22 27.6	- 9 58.6	-0.1364	0.5972	+0.1060	+17	-49
$\phi$ Sagittarii	3.8	4.54	3.9	21 53.4	27 1 49.2	- 6 45.3	-1.1770	0.5960	0.1150	-46	-90
B. A. C. 6607	5.9	4.63	5.4	22 35.5	7 59.7	- 0 49.7	+0.2841	0.5935	0.1311	+42	-25
50 Sagittarii	5.9	4.63	6.2	21 58.6	10 13.2	+ 1 18.5	-0.0307	0.5926	0.1368	+23	-43
$\zeta$ Sagittarii	5.2	4.61	8.8	22 0.2	18 8.8	+ 8 55.2	-0.8362	0.5887	0.1559	-17	-90
57 Sagittarii	6.1	+4.63	+ 9.7	-19 18.1	20 28.2	+11 9.1	-1.1677	0.5875	+0.1613	-40	-90
$\sigma$ Capricorni	5.6	4.70	12.5	19 26.0	28 7 24.4	- 2 20.1	+0.8591	0.5812	0.1847	+71	+ 7
$\pi$ Capricorni	5.1	4.69	13.5	18 32.5	10 39.4	+ 0 47.5	+0.5824	0.5793	0.1911	+66	- 9
$\rho$ Capricorni	5.3	4.67	13.5	18 8.8	11 77.7	+ 1 24.4	+0.3108	0.5789	0.1923	+49	-24
B. A. C. 7044	7.0	4.68	13.6	18 12.4	11 21.2	+ 1 27.7	+0.3813	0.5789	0.1924	+54	-20
$\sigma$ Capricorni	6.2	+4.71	+13.6	-18 55.0	11 42.5	+ 1 48.1	+1.1566	0.5787	+0.1930	+71	+29
B. A. C. 7263	5.9	4.67	16.9	16 25.2	23 17.7	-11 2.7	-1.0259	0.5716	0.2130	+74	+18
9 Aquarii	6.8	4.60	17.6	13 55.5	29 0 47.3	- 9 36.4	-1.1419	0.5707	0.2153	-31	-90
18 Aquarii	5.7	4.61	19.7	13 18.6	10 38.2	- 0 7.0	+0.4346	0.5648	0.2289	+62	-18
B. A. C. 7562	5.5	4.53	21.8	9 30.0	19 42.6	+ 8 38.0	-1.2561	0.5596	0.2390	-38	-90
$\epsilon$ Capricorni	5.5	+4.52	+21.8	- 9 32.7	19 44.7	+ 8 40.0	-1.1965	0.5595	+0.2390	-32	-90
$\epsilon$ Capricorni	6.4	4.53	21.9	9 44.4	20 18.0	+ 9 12.2	-0.8679	0.5593	0.2395	- 8	-90
B. A. C. 7620	6.5	4.54	22.3	10 47.2	23 31.9	-11 40.7	+0.9575	0.5575	0.2425	+79	+12
36 Aquarii	6.3	4.52	23.6	8 40.8	30 6 36.8	- 4 50.6	+0.5866	0.5539	0.2480	+75	-10
$\theta$ Aquarii	4.4	4.51	24.0	8 17.1	9 56.3	- 1 38.0	+1.0183	0.5522	0.2501	+82	+15
51 Aquarii	5.8	+4.46	+24.5	- 5 20.8	13 15.7	+ 1 34.7	-1.0995	0.5507	+0.2520	-22	-90
$\kappa$ Aquarii	5.2	4.43	25.4	- 4 44.8	19 29.6	+ 7 35.9	-0.1251	0.5480	0.2546	+34	-48
$\kappa$ Piscium	4.7	4.35	27.0	+ 0 42.3	31 18 22.7	+ 5 43.6	+0.2219	0.5403	0.2559	+54	-29
9 Piscium	6.6	4.35	27.0	0 34.2	18 31.6	+ 5 52.2	+0.3945	0.5402	0.2558	+64	-21
15 Piscium	6.6	4.33	27.6	0 45.4	22 24.7	+ 9 37.7	+1.1996	0.5395	0.2548	+90	+20
16 Piscium	5.8	+4.32	+27.5	+ 1 32.5	22 50.9	+10 3.1	+0.5116	0.5395	+0.2547	+73	-14

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	s	y	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		$\alpha$	$\delta$	$\alpha$	d h m	h m				$\alpha$	$\delta$
19 Piscium	4.6	+4.30	+27.5	+ 2 55.7	1 3 34.6	- 9 22.5	+0.2957	0.5386	+0.2529	+58	-25
36 Piscium	6.3	4.26	26.9	7 40.9	17 54.8	+ 4 29.9	-1.0152	0.5368	0.2446	-15	-82
d Piscium	5.3	4.25	26.9	7 37.9	19 49.9	+ 6 21.4	-0.4965	0.5367	0.2432	+15	-69
45 Piscium	6.9	4.25	26.8	7 8.1	22 15.6	+ 8 42.4	+0.6039	0.5366	0.2412	+81	- 8
75 Piscium	6.0	4.20	25.6	12 25.0	2 17 41.7	+ 3 30.9	-0.3736	0.5368	0.2217	+21	-58
7 Piscium	3.7	+4.18	+24.3	+14 49.6	8 5 29.3	- 9 4.4	-0.3771	0.5379	+0.2065	+21	-57
101 Piscium	6.3	4.16	23.8	14 8.8	7 31.3	- 7 6.4	+0.7566	0.5380	0.2037	+90	+ 5
103 Piscium	6.8	4.17	23.6	16 6.9	9 8.8	- 5 32.1	-0.9893	0.5381	0.2014	-15	-74
105 Piscium	6.3	4.18	23.6	15 53.7	9 20.7	- 5 20.6	-0.7179	0.5383	0.2011	+ 2	-74
3 Arietis	6.0	4.17	23.1	16 54.5	12 35.6	- 2 11.9	-1.1440	0.5388	0.1963	-27	-73
4 Arietis	5.7	+4.16	+23.2	+16 27.3	13 20.9	- 1 28.1	-0.5170	0.5389	+0.1952	+13	-64
i Arietis	5.7	4.16	22.6	17 19.5	17 38.9	+ 2 40.7	-0.6159	0.5395	0.1886	+ 8	-69
15 Arietis	5.7	4.16	21.5	19 1.5	23 50.7	+ 8 41.0	-1.2863	0.5404	0.1786	-45	-71
B. A. C. 686	7.2	4.15	21.3	19 8.6	4 1 21.3	+10 8.7	-1.1448	0.5407	0.1760	-29	-71
8 Arietis	5.7	4.14	21.0	19 26.1	3 20.6	-11 56.0	-1.1111	0.5410	0.1727	-26	-71
23 Arietis	7.5	+4.14	+21.0	+19 13.6	3 49.3	-11 38.2	-0.8069	0.5411	+0.1719	- 4	-71
26 Arietis	6.0	4.12	20.4	19 24.5	9 9.6	- 6 18.4	-0.1093	0.5420	0.1625	+35	-36
B. A. C. 782	7.0	4.09	20.5	18 26.1	10 33.0	- 4 57.8	+1.1555	0.5422	0.1600	+90	+38
$\mu$ Arietis	6.0	4.11	19.5	19 34.9	14 35.8	- 1 3.0	+0.5616	0.5429	0.1526	+79	0
47 Arietis	6.0	4.09	18.4	20 15.9	21 49.4	+ 5 56.6	+0.8858	0.5441	0.1389	+90	+20
e Arietis	4.6	+4.09	+18.1	+20 56.2	22 21.1	+ 6 26.8	+0.2337	0.5442	+0.1379	+55	-16
66 Arietis	6.0	4.04	15.6	22 27.4	5 11 43.6	- 4 37.7	+0.2613	0.5460	0.1111	+57	-11
7 Tauri	6.0	4.05	14.7	24 7.6	14 26.2	- 2 0.5	-1.2566	0.5465	0.1055	-48	-66
9 Tauri	7.0	4.00	14.8	22 52.6	15 36.5	- 0 52.6	+0.2209	0.5466	0.1030	+56	-13
g Pleiadum	6.3	4.00	13.9	23 58.3	19 9.4	+ 2 33.1	-0.6170	0.5470	0.0955	+ 6	-60
17 Tauri	4.3	+4.00	+14.0	+23 47.8	19 11.6	+ 2 35.3	-0.4221	0.5470	+0.0955	+18	-47
18 Tauri	6.3	4.02	13.7	24 31.4	19 18.6	+ 2 42.0	-1.2011	0.5470	0.0952	-39	-65
19 Tauri	5.0	4.01	13.9	24 9.0	19 20.3	+ 2 43.7	-0.7939	0.5470	0.0952	- 5	-66
20 Tauri	5.0	4.00	13.8	24 3.2	19 37.2	+ 2 59.9	-0.6605	0.5471	0.0945	+ 4	-63
21 Tauri	7.0	4.01	13.7	24 14.4	19 39.3	+ 3 2.0	-0.8606	0.5471	0.0945	- 9	-66
22 Tauri	7.0	+4.00	+13.7	+24 12.8	19 43.1	+ 3 5.6	-0.8257	0.5471	+0.0944	- 7	-66
23 Tauri	4.7	3.99	13.9	23 38.1	19 51.3	+ 3 13.6	-0.1833	0.5471	0.0941	+31	-33
7 Tauri	3.1	3.99	13.7	23 47.6	20 22.8	+ 3 44.2	-0.3067	0.5471	0.0929	+24	-40
B. A. C. 1170	6.3	3.97	13.9	23 6.7	20 47.0	+ 4 7.4	+0.4719	0.5472	0.0921	+72	+ 2
26 Tauri	7.0	3.98	13.6	23 32.9	21 2.9	+ 4 22.8	+0.0211	0.5472	0.0915	+42	-22
27 Tauri	4.0	+3.98	+13.6	+23 44.7	21 8.6	+ 4 28.3	-0.1837	0.5472	+0.0913	+29	-33
28 Tauri	6.2	3.98	13.6	23 49.7	21 9.2	+ 4 28.9	-0.2745	0.5472	0.0913	+26	-38
33 Tauri	6.3	3.94	13.4	22 53.0	6 0 45.0	+ 7 57.3	+1.0706	0.5476	0.0835	+90	+39
B. A. C. 1238	6.3	3.94	12.8	22 55.1	2 30.7	+ 9 39.4	+1.1772	0.5477	0.0797	+90	+49
36 Tauri	6.0	3.93	12.5	23 49.7	4 2.8	+11 8.4	+0.3038	0.5478	0.0764	+60	- 6
x Tauri	5.7	+3.90	+10.6	+25 23.5	12 16.4	- 4 54.8	-0.8516	0.5482	+0.0583	- 9	-65
62 Tauri	6.0	3.86	10.9	24 4.0	12 56.5	- 4 16.0	+0.6380	0.5482	0.0568	+90	+14
95 Tauri	6.3	3.78	9.4	23 53.9	21 39.3	+ 4 9.0	+1.2350	0.5483	0.0374	+90	+59
k Tauri	6.0	3.75	7.8	24 53.7	7 4 23.9	+10 39.9	+0.3420	0.5481	0.0222	+63	+ 2
103 Tauri	6.0	3.68	7.3	24 7.9	8 55.9	- 8 57.3	+1.2597	0.5478	+0.0119	+90	+64
118 Tauri	5.7	+3.64	+ 5.3	+25 4.1	18 32.4	+ 0 19.6	+0.2402	0.5468	-0.0095	+56	- 3
125 Tauri	6.0	3.60	4.1	25 50.5	23 17.9	+ 4 55.5	-0.6827	0.5461	0.0201	+ 2	-60
132 Tauri	5.3	3.51	3.8	24 32.1	8 3 34.6	+ 9 3.5	+0.6545	0.5454	0.0295	+90	+17
139 Tauri	5.3	3.51	2.7	25 56.5	7 40.0	-10 59.3	-1.0408	0.5447	0.0385	-24	-64
5 Geminorum	6.7	3.41	2.0	24 26.7	13 56.7	- 4 55.2	+0.3323	0.5433	0.0521	+61	- 2
8 Geminorum	6.5	+3.37	+ 1.8	+24 0.2	16 10.1	- 2 46.2	+0.6981	0.5428	-0.0568	+90	+17
9 Geminorum	6.3	3.37	1.8	23 46.5	16 28.7	- 2 28.3	+0.9321	0.5427	0.0575	+90	+32
10 Geminorum	7.0	3.35	1.7	23 38.6	17 22.5	- 1 36.2	+1.0253	0.5426	0.0594	+90	+38
11 Geminorum	7.3	3.35	+ 1.7	23 30.6	17 34.3	- 1 24.8	+1.1617	0.5425	0.0598	+90	+49
MARS				23 33.3	19 32.7	+ 0 29.5	+0.9892	0.5145	0.0640	+90	+34
44 Geminorum	6.0	+3.11	- 1.7	+22 47.4	9 15 10.2	- 4 31.4	+0.1864	0.5365	-0.1037	+52	-15

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

SEPTEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	$\alpha'$	$\gamma'$	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
$\delta$ Geminorum	3.5	+3.01	-2.6	+22 10.2	9 22 15.6	+ 2 20.4	+0.0895	0.5343	-0.1171	+46	-21
58 Geminorum	6.3	3.03	3.2	23 8.4	23 50.6	+ 3 52.3	-1.1728	0.5338	0.1201	-35	-67
63 Geminorum	5.7	2.97	2.7	21 39.2	10 1 55.9	+ 5 53.5	+0.2181	0.5332	0.1239	+54	-16
79 Geminorum	6.3	2.86	3.9	20 33.6	10 23.3	- 9 55.2	+0.3168	0.5305	0.1388	+60	-12
85 Geminorum	6.0	2.80	4.6	20 9.1	15 32.1	- 4 56.0	+0.0266	0.5288	0.1475	+43	-28
$\zeta$ Can. ri	4.8	+2.69	-5.2	+17 57.2	23 43.9	+ 3 0.4	+1.1867	0.5261	-0.1607	+90	+40
$\alpha^1$ Cancrri	6.0	2.66	6.1	18 39.5	11 5 16.3	+ 8 22.7	-0.5036	0.5246	0.1691	+14	-61
B. A. C. 2810	7.0	2.63	5.9	17 30.8	5 59.0	+ 9 4.0	+0.6350	0.5244	0.1702	+87	+ 1
$\alpha^2$ Cancrri	6.0	2.61	5.9	17 22.8	6 32.1	+ 9 36.1	+0.6869	0.5241	0.1710	+90	+ 4
$\theta$ Cancrri	5.7	2.61	6.5	18 26.2	9 23.8	-11 37.5	-0.9701	0.5234	0.1751	-15	-72
54 Cancrri	6.3	+2.47	-6.9	+15 43.6	19 14.8	- 2 4.3	+0.2149	0.5207	-0.1885	+54	-23
$\alpha^1$ Cancrri	5.7	2.46	7.3	15 42.7	22 24.1	+ 0 59.2	-0.3700	0.5199	0.1925	+21	-55
$\alpha^2$ Cancrri	6.0	2.46	7.4	15 58.2	22 34.1	+ 1 8.9	-0.6858	0.5199	0.1928	+ 4	-74
$\xi$ Leonis	5.3	2.27	8.6	11 44.9	12 16 16.3	- 5 40.5	+0.3332	0.5162	0.2126	+61	-20
$\sigma$ Leonis	3.8	2.22	8.8	10 21.2	21 3.3	- 1 2.0	+0.8231	0.5155	0.2172	+90	+ 6
10 Sextantis	6.0	+2.17	-9.3	+ 9 24.8	12 5 0.2	+ 6 40.8	+0.0891	0.5146	-0.2240	+46	-34
11 Sextantis	6.0	2.16	9.3	8 47.9	5 53.1	+ 7 32.2	+0.5587	0.5145	0.2247	+77	-10
$\pi$ Leonis	5.0	2.15	9.4	+ 8 31.9	6 58.6	+ 8 35.7	+0.6024	0.5144	0.2256	+81	- 8
NEW MOON.											
75 Virginis	6.0	+2.13	-14.7	-14 50.5	17 17 45.8	- 7 52.1	+0.3526	0.5464	-0.2079	+55	-22
83 Virginis	6.0	2.18	14.9	15 40.2	23 4.1	- 2 44.5	+0.1287	0.5499	0.2009	+41	-34
85 Virginis	6.5	2.18	14.8	15 15.5	23 34.0	- 2 15.6	-0.3987	0.5504	0.2002	+14	-65
B. A. C. 4722	5.8	2.33	14.8	17 43.7	18 12 50.4	+10 33.3	-0.3640	0.5592	0.1799	+13	-63
42 Libræ	5.7	2.90	13.5	23 29.4	20 0 24.6	- 3 11.2	+0.4049	0.5820	0.1058	+47	-18
B. A. C. 5253	5.8	+3.00	-13.0	-24 14.0	5 52.1	+ 2 3.7	+0.6234	0.5849	-0.0923	+60	- 6
B. A. C. 5254	5.8	2.99	12.8	23 40.7	5 53.5	+ 2 5.0	+0.0533	0.5849	0.0922	+25	-38
19 Scorprii	5.1	3.17	11.3	23 55.6	16 28.3	-11 45.1	-0.5212	0.5897	0.0645	- 7	-77
$\sigma$ Scorprii	3.4	3.20	11.8	25 21.1	16 39.9	-11 34.0	+0.9199	0.5898	0.0639	+65	+14
22 Scorprii	5.5	3.25	11.1	24 53.6	20 12.7	- 8 9.6	+0.2431	0.5911	0.0543	+32	-27
25 Scorprii	7.0	+3.39	-10.0	-25 20.7	21 2 41.8	- 1 56.0	+0.4085	0.5930	-0.0364	+41	-17
18 Ophiuchi	6.7	3.41	9.8	24 27.9	3 50.0	- 0 50.5	-0.5279	0.5933	0.0331	-10	-80
B. A. C. 5709	6.3	3.46	8.9	24 56.4	7 47.3	+ 2 57.3	-0.1536	0.5942	0.0220	+ 8	-50
26 Ophiuchi	6.1	3.46	8.9	24 50.2	7 51.8	+ 3 1.6	-0.2603	0.5942	0.0218	+ 2	-57
31 Ophiuchi	6.7	3.51	8.7	25 30.1	9 37.4	+ 4 43.0	+0.3834	0.5945	0.0168	+38	-19
B. A. C. 5813	6.8	+3.59	-9.0	-26 24.1	14 4.4	+ 8 59.1	+1.2515	0.5951	-0.0040	+64	+52
39 Ophiuchi (S. star)	6.0	3.56	7.2	24 10.7	14 46.9	+ 9 39.9	-1.0112	0.5952	0.0021	-42	-90
B. A. C. 5831	6.9	3.55	7.2	23 57.8	14 49.3	+ 9 42.2	-1.2303	0.5953	-0.0019	-61	-90
B. A. C. 5846	6.8	3.60	7.2	24 48.3	16 11.5	+11 1.2	-0.3740	0.5954	+0.0020	- 5	-65
$\theta$ Ophiuchi	3.3	3.61	7.2	24 54.0	16 18.6	+11 8.0	-0.2773	0.5954	0.0023	0	-58
B. A. C. 5868	7.0	+3.61	-6.6	-24 9.1	17 31.0	-11 42.6	-1.0320	0.5954	+0.0059	-43	-90
$\delta$ Ophiuchi	4.4	3.61	6.6	24 5.0	18 0.4	-11 14.3	-1.0987	0.5955	0.0071	-48	-90
63 Ophiuchi	6.6	3.82	4.3	24 52.0	22 5 0.1	- 0 41.4	-0.0513	0.5952	0.0386	+15	-44
B. A. C. 6066	7.3	3.82	3.7	23 55.5	5 52.6	+ 0 9.0	-0.9702	0.5951	0.0410	-36	-90
4 Sagittarii	5.4	3.82	3.5	23 48.5	6 54.6	+ 1 8.4	-1.0457	0.5950	0.0440	-41	-90
5 Sagittarii	7.0	+3.84	-3.6	-24 16.6	7 3.3	+ 1 16.8	-0.5637	0.5950	+0.0444	-11	-81
7 Sagittarii	5.9	3.86	3.3	24 16.9	8 5.1	+ 2 16.1	-0.5108	0.5949	0.0473	- 8	-76
9 Sagittarii	6.0	3.86	3.3	24 21.8	8 28.7	+ 2 38.8	-0.4094	0.5948	0.0484	- 3	-68
B. A. C. 6161	5.7	3.89	2.4	23 43.4	11 31.8	+ 5 34.5	-0.8975	0.5943	0.0570	-30	-90
B. A. C. 6304	7.0	4.03	0.5	24 11.0	19 53.4	-10 24.0	+0.1426	0.5923	0.0800	+29	-33
24 Sagittarii	5.9	+4.03	-0.4	-24 6.5	20 8.7	-10 9.4	+0.0862	0.5921	+0.0807	+26	-36
25 Sagittarii	6.3	4.05	-0.4	24 18.0	20 24.0	- 9 54.6	+0.3008	0.5921	0.0814	+38	-24
B. A. C. 6343	6.3	4.04	+0.3	23 35.5	21 57.7	- 8 24.7	-0.2852	0.5916	0.0856	+ 7	-59
26 Sagittarii	6.6	4.07	0.5	23 55.7	23 15.9	- 7 9.6	+0.1689	0.5912	0.0890	+31	-31
28 Sagittarii	5.6	4.05	1.4	22 29.9	23 1 2.9	- 5 26.8	-1.1139	0.5906	0.0938	-42	-90
30 Sagittarii	6.6	+4.07	+ 2.0	-22 16.7	2 49.4	- 3 44.5	-1.1661	0.5900	+0.0984	-47	-90

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.												
SEPTEMBER.												
THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.		
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>z'</i>	<i>y'</i>	<i>N.</i>	<i>S.</i>	
		$\Delta\alpha$	$\Delta\delta$		d h m	h m						
$\mu$ Sagittarii	5.0	+4.11	+ 2.1	-22 52.2	23 4 7.4	- 2 29.6	-0.4377	0.5895	+0.1018	+ 1	-70	
$\mu$ Sagittarii	5.1	4.11	2.2	22 47.9	4 29.7	- 2 4.3	-0.4718	0.5894	0.1028	- 1	-72	
B. A. C. 6448	6.4	4.13	2.1	23 18.2	4 50.5	- 1 48.2	+0.0768	0.5892	0.1037	+28	-37	
$\sigma$ Sagittarii	3.8	4.14	3.4	21 53.4	8 17.7	+ 1 30.8	-0.9809	0.5879	0.1125	-30	-90	
B. A. C. 6607	5.9	4.24	4.8	22 35.5	14 38.6	+ 7 36.8	+0.4925	0.5851	0.1282	+54	-14	
50 Sagittarii	5.9	+4.25	+ 5.5	-21 58.6	16 55.9	+ 9 48.8	+0.1715	0.5840	+0.1337	+36	+31	
$\zeta$ Sagittarii	5.2	4.28	8.2	20 0.2	24 1 5.6	- 6 20.4	-0.6531	0.5799	0.1523	- 6	-90	
57 Sagittarii	6.1	4.29	9.0	19 18.1	3 29.2	- 4 2.3	-0.9908	0.5786	0.1575	-26	-90	
$\sigma$ Capricorni	5.6	4.41	11.6	19 26.0	14 45.4	+ 6 48.5	+1.0507	0.5724	0.1803	+71	+21	
$\pi$ Capricorni	5.1	4.41	12.6	18 32.6	18 6.3	+10 2.0	+0.7629	0.5705	0.1865	+67	+ 1	
$\rho$ Capricorni	5.3	+4.41	+12.9	-18 8.8	18 45.7	+10 40.0	+0.4865	0.5701	+0.1877	+60	-15	
B. A. C. 7044	7.0	4.41	12.7	18 12.4	18 49.3	+10 43.4	+0.5578	0.5701	0.1878	+64	-11	
B. A. C. 7263	5.9	4.45	16.3	16 25.2	25 7 7.2	- 1 25.5	+1.1912	0.5632	0.2080	+73	+32	
9 Aquarii	6.8	4.40	17.3	13 55.6	8 39.5	+ 0 3.5	-1.0082	0.5624	0.2102	-21	-90	
18 Aquarii	5.7	4.46	19.3	13 18.6	18 47.1	+ 9 49.7	+0.5701	0.5571	0.2236	+70	-10	
B. A. C. 7562	5.5	+4.42	+22.0	- 9 30.0	26 4 6.0	- 5 10.7	-1.1550	0.5526	+0.2337	-29	-90	
$\epsilon$ Capricorni	5.5	4.42	22.0	9 32.9	4 8.2	- 5 8.6	-1.1004	0.5525	0.2337	-25	-90	
$\epsilon$ Capricorni	6.4	4.43	22.0	9 44.4	4 42.3	- 4 35.6	-0.7691	0.5523	0.2343	- 3	-90	
B. A. C. 7620	6.5	4.47	22.3	10 47.2	8 1.0	- 1 23.8	+1.0710	0.5508	0.2373	+79	+20	
36 Aquarii	6.3	4.47	23.8	8 40.8	15 16.0	+ 5 36.5	+0.6790	0.5478	0.2430	+81	- 5	
$\theta$ Aquarii	4.4	+4.48	+24.3	- 8 17.1	18 39.9	+ 8 53.6	+1.1074	0.5466	+0.2452	+82	+22	
44 Aquarii	6.4	4.45	24.6	5 53.4	18 49.0	+ 9 2.4	-1.2868	0.5465	0.2452	-40	-90	
51 Aquarii	5.8	4.44	25.3	5 20.8	22 3.6	-11 49.5	-1.0410	0.5453	0.2471	-18	-90	
$\kappa$ Aquarii	5.2	4.45	26.2	4 44.8	27 4 24.9	- 5 40.9	-0.0713	0.5433	0.2499	+36	-44	
B. A. C. 7951 (mean)	6.7	4.46	26.5	- 4 45.0	9 8.3	- 1 6.8	+1.1175	0.5420	0.2514	+85	+22	
$\kappa$ Piscium	4.7	+4.49	+28.7	+ 0 42.5	28 3 38.0	- 7 13.1	+0.2188	0.5385	+0.2523	+53	-29	
9 Piscium	6.6	4.49	28.7	0 34.2	3 47.1	- 7 4.3	+0.3956	0.5384	0.2523	+64	-20	
15 Piscium	6.6	4.50	28.8	0 45.5	7 42.4	- 3 16.6	+1.1921	0.5384	0.2514	+90	+30	
16 Piscium	5.8	4.48	29.0	1 32.5	8 8.9	- 2 51.0	+0.4961	0.5384	0.2514	+70	-14	
19 Piscium	4.9	4.49	29.2	2 55.7	12 54.9	+ 1 45.8	+0.2692	0.5376	0.2498	+56	-27	
36 Piscium	6.3	+4.52	+29.6	+ 7 40.9	29 3 19.1	- 8 17.8	-1.0837	0.5374	+0.2423	-20	-82	
$\delta$ Piscium	5.3	4.53	29.6	7 37.9	5 14.4	- 6 26.1	-0.5679	0.5374	0.2410	+11	-74	
45 Piscium	6.9	4.54	29.5	7 8.1	7 40.3	- 4 4.9	+0.5296	0.5376	0.2391	+74	-12	
75 Piscium	6.0	4.61	28.8	12 25.0	30 3 3.7	- 9 19.1	-0.4957	0.5398	0.2206	+15	-66	
$\eta$ Piscium	3.7	4.65	27.8	14 49.7	14 46.7	+ 2 1.0	-0.5241	0.5417	0.2059	+13	-66	
101 Piscium	6.3	+4.64	+27.5	+14 8.9	16 47.8	+ 3 58.2	+0.6038	0.5421	+0.2031	+83	- 3	
103 Piscium	6.8	4.67	27.2	16 6.9	18 24.5	+ 5 31.6	-1.1421	0.5424	0.2008	-27	-74	
105 Piscium	6.3	4.67	27.2	15 53.8	18 36.3	+ 5 43.1	-0.8716	0.5424	0.2005	- 8	-74	
3 Arietis	6.0	4.69	26.7	16 54.5	21 49.3	+ 8 49.8	-1.3034	0.5430	0.1958	-47	-73	
4 Arietis	5.7	+4.68	+26.7	+16 27.3	22 34.1	+ 9 33.1	-0.6794	0.5432	+0.1947	+ 4	-73	
OCTOBER.												
$\epsilon$ Arietis	5.7	+4.69	+26.1	+17 19.6	1 2 49.7	-10 19.8	-0.7856	0.5441	+0.1882	- 3	-73	
$\theta$ Arietis	5.7	+4.73	+24.7	+19 26.2	12 25.0	- 1 3.6	-1.2960	0.5460	+0.1724	-49	-71	
23 Arietis	7.5	4.73	24.6	19 13.7	12 53.4	- 0 36.3	-0.9936	0.5461	0.1716	-17	-71	
26 Arietis	6.0	4.73	23.8	19 24.7	18 9.9	+ 4 29.8	-0.3102	0.5471	0.1623	+24	-47	
B. A. C. 782	7.0	4.71	23.8	18 26.2	19 32.2	+ 5 49.3	+0.9502	0.5474	0.1599	+90	+22	
$\mu$ Arietis	6.0	4.76	22.8	19 35.0	23 32.0	+ 9 41.1	+0.3525	0.5482	0.1525	+62	-11	
47 Arietis	6.0	+4.77	+21.5	+20 15.9	2 6 40.5	- 7 24.9	+0.6644	0.5495	+0.1388	+90	+ 7	
$\epsilon$ Arietis	4.6	4.77	21.3	20 56.3	7 11.4	- 6 55.1	+0.0145	0.5496	0.1378	+41	-27	
$\zeta$ Arietis	4.8	4.75	20.1	20 40.3	14 18.3	- 0 2.7	+1.2327	0.5506	0.1235	+90	+51	
66 Arietis	6.0	4.78	18.5	22 27.4	20 23.5	+ 5 50.0	+0.0246	0.5514	0.1109	+42	-24	
9 Tauri	7.0	4.77	17.6	22 52.7	3 0 13.4	+ 9 32.1	-0.0201	0.5519	0.1028	+40	-25	
$\delta$ Pleiadum	6.3	+4.78	+16.6	+23 58.4	3 43.5	-11 4.9	-0.8580	0.5522	+0.0953	- 9	-66	

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
17 Tauri	4.3	+4.78	+16.7	+23 47.8	3 3 45.6	-11 2.9	-0.6642	0.5522	+0.0952	+3	-63
19 Tauri	5.0	4.79	16.6	24 9.1	3 54.2	-10 54.6	-1.0344	0.5522	0.0949	-22	-66
20 Tauri	5.0	4.78	16.6	24 3.2	4 11.0	-10 38.4	-0.9017	0.5522	0.0943	-12	-66
21 Tauri	7.0	4.79	16.5	24 14.4	4 13.0	-10 36.4	-1.1010	0.5522	0.0942	-28	-66
22 Tauri	7.0	4.79	16.5	24 12.8	4 16.8	-10 32.8	-1.0662	0.5522	0.0938	-25	-66
23 Tauri	4.7	+4.77	+16.6	+23 38.1	4 24.9	-10 25.0	-0.4271	0.5522	+0.0938	+17	-47
7 Tauri	3.1	4.77	16.4	23 47.7	4 56.0	-9 54.9	-0.5512	0.5523	0.0927	+10	-55
B. A. C. 1170	6.3	4.75	16.5	23 6.7	5 19.9	-9 31.8	+0.2239	0.5523	0.0918	+54	-11
26 Tauri	7.0	4.76	16.3	23 32.9	5 35.6	-9 16.7	-0.2249	0.5523	0.0912	+28	-35
27 Tauri	4.0	4.77	16.3	23 44.8	5 41.2	-9 11.3	-0.4299	0.5523	0.0910	+17	-48
28 Tauri	6.2	+4.77	+16.3	+23 49.8	5 41.8	-9 10.7	-0.5193	0.5523	+0.0910	+12	-53
33 Tauri	6.3	4.73	15.8	22 52.8	9 15.0	-5 44.8	+0.8157	0.5525	0.0852	+90	+22
B. A. C. 1238	6.3	4.74	15.2	22 55.1	10 59.4	-4 4.0	+0.9201	0.5526	0.0794	+90	+28
36 Tauri	6.0	4.73	14.9	23 49.7	12 30.4	-2 36.1	+0.0493	0.5527	0.0761	+44	-19
7 Tauri	5.7	4.74	12.7	25 23.5	20 38.4	+5 15.1	-1.1109	0.5528	0.0579	-30	-65
62 Tauri	6.0	+4.70	+13.0	+24 4.0	21 18.0	+5 53.4	+0.3741	0.5527	+0.0564	+65	0
95 Tauri	6.3	4.64	10.9	23 53.9	4 5 55.4	-9 47.1	+0.9621	0.5523	0.0369	+90	+36
4 Tauri	6.0	4.62	9.1	24 53.7	12 36.4	-3 19.8	+0.0687	0.5516	0.0217	+45	-13
103 Tauri	6.0	4.56	8.4	24 7.9	17 6.2	+1 0.7	+0.9804	0.5510	+0.0116	+90	+39
118 Tauri	5.7	4.51	5.9	25 4.1	5 2 38.7	+10 13.7	-0.0396	0.5506	-0.0099	+39	-17
121 Tauri	6.0	+4.45	+ 5.6	+23 58.4	5 28.3	-11 2.4	+1.1299	0.5487	-0.0162	+90	+50
125 Tauri	6.0	4.49	4.5	25 50.5	7 22.7	-9 11.9	-0.9615	0.5483	0.0204	-18	-64
132 Tauri	5.3	4.40	4.0	24 32.1	11 38.2	-5 5.1	+0.3706	0.5472	0.0298	+65	+2
2 Geminorum	7.2	4.29	2.4	23 38.9	19 48.8	+2 49.1	+1.0318	0.5450	0.0476	+90	+40
5 Geminorum	6.7	4.30	1.6	24 26.6	21 58.5	+4 54.4	+0.0472	0.5442	0.0522	+44	-17
8 Geminorum	6.5	+4.26	+ 1.3	+24 0.2	6 0 11.6	+7 3.0	+0.4091	0.5437	-0.0569	+67	+2
9 Geminorum	6.3	4.25	1.3	23 46.5	0 30.2	+7 21.1	+0.6455	0.5436	0.0575	+90	+14
10 Geminorum	7.0	4.24	1.2	23 38.5	1 23.9	+8 12.9	+0.7416	0.5434	0.0594	+90	+20
11 Geminorum	7.3	4.23	+ 1.2	23 30.6	1 35.7	+8 24.4	+0.8747	0.5432	0.0598	+90	+28
44 Geminorum	6.0	3.97	- 3.1	22 47.4	23 12.7	+5 18.8	-0.0967	0.5357	0.1031	+35	-30
8 Geminorum	3.5	+3.86	- 4.3	+22 10.1	7 6 19.4	-11 48.1	-0.1907	0.5331	-0.1163	+30	-36
63 Geminorum	5.7	3.81	4.9	21 39.1	10 0.8	-8 13.8	-0.0609	0.5318	0.1230	+37	-30
79 Geminorum	6.3	3.66	6.1	20 33.6	18 30.7	0 0.0	+0.0389	0.5286	0.1376	+43	-26
85 Geminorum	6.0	3.60	6.8	20 9.1	23 41.3	+5 1.0	-0.2446	0.5268	0.1461	+27	-42
B. A. C. 2658	7.2	3.53	6.7	18 31.4	8 2 12.1	+7 27.1	+1.1840	0.5258	0.1501	+90	+41
71 Cancri	4.8	+3.45	- 7.5	+17 57.2	7 56.2	-10 59.5	+0.9230	0.5239	-0.1590	+90	+20
21 Cancri	6.0	3.40	8.7	18 39.4	13 31.0	-5 34.9	-0.7638	0.5221	0.1672	-2	-65
B. A. C. 2810	7.0	3.37	8.4	17 30.8	14 14.0	-4 53.3	+0.3766	0.5219	0.1682	+65	-12
22 Cancri	6.0	3.35	8.5	17 22.8	14 47.4	-4 20.9	+0.4510	0.5217	0.1690	+69	-10
8 Cancri	5.7	3.35	9.2	18 26.2	17 40.2	-1 33.3	-1.2265	0.5208	0.1731	-37	-72
54 Cancri	6.3	+3.16	- 9.6	+15 43.6	9 3 35.6	+8 4.2	-0.0291	0.5181	-0.1862	+39	-35
61 Cancri	5.7	3.14	10.1	15 42.7	6 46.1	+11 8.9	-0.6100	0.5173	0.1901	+8	-70
62 Cancri	6.0	3.14	10.2	15 58.2	6 56.2	+11 18.7	-0.9260	0.5173	0.1903	-11	-74
5 Leonis	5.3	2.88	11.3	11 44.9	10 0 45.5	+4 36.5	+0.1206	0.5139	0.2090	+47	-31
6 Leonis	3.8	2.78	11.5	10 21.2	5 34.2	+9 16.7	+0.6190	0.5134	0.2144	+82	-5
10 Sextantis	6.0	+2.72	-11.9	+ 9 24.8	13 33.3	-6 58.2	-0.1003	0.5128	-0.2213	+35	-44
11 Sextantis	6.0	2.71	11.9	8 47.8	14 26.4	-6 6.6	+0.3711	0.5127	0.2220	+63	-19
11 Leonis	5.0	2.69	11.9	8 31.8	15 32.2	-5 2.7	+0.4165	0.5127	0.2228	+66	-17
43 Leonis	6.5	2.57	12.8	7 3.4	11 3 28.4	+6 32.5	-0.6999	0.5130	0.2310	+4	-83
34 Sextantis	6.7	2.45	12.7	4 6.7	13 44.5	-7 29.4	+0.0685	0.5140	0.2364	+45	-37
351 Sextantis	6.2	+2.47	-13.1	+ 5 16.7	14 5.8	-7 8.7	-1.2632	0.5141	-0.2365	-36	-85
36 Sextantis	6.6	2.43	12.7	3 1.3	15 3.8	-6 12.4	+0.9264	0.5142	0.2369	+90	+10
13 Leonis	5.4	2.35	12.9	0 32.7	12 0 39.2	+3 6.1	+1.2822	0.5161	0.2402	+90	+38
13 Leonis	6.2	2.34	13.4	2 30.3	2 21.7	+4 45.6	-1.2210	0.5165	0.2406	-31	-87
13 Leonis	5.7	2.32	13.2	+ 0 28.9	5 53.2	+8 10.9	+0.0873	0.5174	0.2413	+46	-36
13 Leonis	5.3	+2.26	-13.3	- 2 26.7	14 22.1	-7 35.4	+1.1423	0.5201	-0.2422	+88	+25

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.											
OCTOBER.											
THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	z'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
B. A. C. 4006 7 Virginis	6.1 5.7	+2.20 2.13	-13.5 13.9	- 4 46.2 8 53.6	d h m 13 0 51.0 21 52.4	h m + 2 34.4 - 1 3.4	+1.0594 +0.3716	0.5242 0.5350	-0.2415 0.2334	+85 +60	+18 -21
NEW MOON.											
42 Libræ	5.7	2.63	11.8	23 29.4	17 6 45.2	+ 4 57.0	+0.5907	0.5903	0.1055	+59	- 7
B. A. C. 5253	5.8	+2.71	-11.3	-24 13.9	12 5.4	+10 4.5	+0.8157	0.5929	-0.0918	+66	+ 8
B. A. C. 5254	5.8	2.70	11.2	23 40.6	12 6.7	+10 5.7	+0.2513	0.5929	0.0918	+36	-27
19 Scorpii	5.1	2.83	9.9	23 55.6	22 28.5	- 3 57.4	-0.3032	0.5970	0.0638	+ 4	-60
σ Scorpii	3.4	2.86	10.1	25 21.0	22 39.9	- 3 46.5	+1.1254	0.5971	0.0633	+65	+32
ρ Ophiuchi (S. star)	5.0	2.84	9.4	23 12.9	18 0 23.5	- 2 7.1	-1.1403	0.5976	0.0584	-48	-90
22 Scorpii	5.5	+2.90	- 9.5	-24 53.6	2 0.6	- 0 26.2	+0.4594	0.5982	-0.0535	+46	-15
25 Scorpii	7.0	3.00	8.6	25 20.7	8 30.8	+ 5 40.4	+0.6317	0.5996	0.0355	+57	+ 4
18 Ophiuchi	6.7	3.02	8.1	24 27.8	9 37.8	+ 6 44.7	-0.2961	0.5998	0.0322	+ 2	-59
B. A. C. 5709	6.3	3.06	7.8	24 56.3	13 31.3	+10 28.6	+0.0798	0.6003	0.0210	+20	-36
26 Ophiuchi	6.1	3.06	7.6	24 50.1	13 35.7	+10 32.8	-0.0261	0.6003	0.0205	+15	-42
31 Ophiuchi	6.7	+3.10	- 7.6	-25 30.1	15 19.7	-11 47.4	+0.6149	0.6005	-0.0158	+54	- 6
39 Ophiuchi (S. star)	6.0	3.14	6.2	24 10.7	20 24.8	- 6 54.8	-0.7650	0.6006	0.0011	-27	-90
B. A. C. 5831	6.9	3.14	6.4	23 57.7	20 27.1	- 6 52.6	-0.9827	0.6006	-0.0010	-40	-90
B. A. C. 5846	6.8	3.17	6.2	24 48.3	21 48.2	- 5 34.8	-0.1306	0.6006	+0.0030	+ 8	-49
θ Ophiuchi	3.3	3.17	6.2	24 54.0	21 55.3	- 5 28.6	-0.0344	0.6006	0.0033	+13	-43
B. A. C. 5868	7.0	+3.16	- 5.7	-24 9.1	23 6.7	- 4 19.6	-0.7834	0.6005	+0.0067	-27	-90
δ Ophiuchi	4.4	3.18	5.7	24 5.0	23 35.8	- 3 51.6	-0.8494	0.6005	0.0082	-31	-90
α Ophiuchi	5.2	3.20	5.2	23 53.1	19 1 31.4	- 2 0.8	-1.0277	0.6003	0.0138	-43	-90
63 Ophiuchi	6.6	3.35	3.7	24 52.0	10 28.4	+ 6 34.3	+0.2012	0.5989	0.0395	+29	-29
B. A. C. 6066	7.3	3.35	3.2	23 55.5	11 20.6	+ 7 24.4	-0.7129	0.5987	0.0420	-20	-90
4 Sagittarii	5.4	+3.36	- 3.1	-23 48.5	12 22.1	+ 8 23.3	-0.7875	0.5984	+0.0449	-24	-90
5 Sagittarii	7.0	3.38	3.1	24 16.6	12 30.7	+ 8 31.7	-0.3074	0.5984	0.0453	+ 2	-60
7 Sagittarii	5.9	3.39	2.9	24 16.9	13 32.0	+ 9 30.4	-0.2541	0.5981	0.0482	+ 5	-56
9 Sagittarii	6.0	3.39	2.8	24 21.8	13 55.4	+ 9 52.9	-0.1529	0.5980	0.0493	+11	-50
B. A. C. 6161	5.7	3.42	2.0	23 43.4	16 57.2	-11 12.7	-0.6386	0.5971	0.0577	-15	-90
B. A. C. 6304	7.0	+3.55	- 0.4	-24 11.0	20 1 16.5	- 3 13.6	+0.4037	0.5940	+0.0803	+44	-18
24 Sagittarii	5.9	3.55	0.3	24 6.5	1 31.8	- 2 58.9	+0.3482	0.5939	0.0813	+41	-21
25 Sagittarii	6.3	3.56	- 0.3	24 18.0	1 47.1	- 2 44.2	+0.5626	0.5938	0.0819	+55	- 9
B. A. C. 6343	6.3	3.56	+ 0.4	23 35.5	3 20.5	- 1 14.6	-0.0215	0.5931	0.0861	+21	-42
26 Sagittarii	6.6	3.59	0.5	23 55.7	4 38.5	+ 0 0.4	+0.4323	0.5929	0.0895	+47	-16
28 Sagittarii	5.6	+3.58	+ 1.4	-22 29.9	6 25.5	+ 1 43.1	-0.8489	0.5916	+0.0942	-23	-90
30 Sagittarii	6.6	3.59	1.9	22 16.7	8 11.9	+ 3 25.2	-0.8997	0.5907	0.0988	-26	-90
31 Sagittarii	7.0	3.59	2.1	22 2.4	8 42.6	+ 3 54.7	-1.0892	0.5905	0.1001	-40	-90
1 <sup>st</sup> Sagittarii	5.0	3.62	2.0	22 52.2	9 29.8	+ 4 40.1	-0.1718	0.5901	0.1021	+14	-51
1 <sup>st</sup> Sagittarii	5.1	3.63	2.1	22 47.9	9 52.1	+ 5 1.4	-0.2062	0.5899	0.1030	+13	-53
B. A. C. 6448	6.4	+3.65	+ 2.0	-23 18.3	10 13.0	+ 5 21.6	+0.3428	0.5897	+0.1039	+43	-22
σ Sagittarii	3.8	3.66	3.2	21 53.4	13 40.4	+ 8 40.7	-0.7137	0.5879	0.1126	-14	-90
π Sagittarii	3.1	3.66	3.9	21 11.1	15 42.7	+10 38.3	-1.1924	0.5868	0.1175	-48	-90
B. A. C. 6607	5.9	3.76	4.4	22 35.5	20 2.6	- 9 11.9	+0.7617	0.5842	0.1279	+67	+ 3
50 Sagittarii	5.9	3.77	5.1	21 58.6	22 20.5	- 6 59.3	+0.4406	0.5829	0.1332	+53	-17
f Sagittarii	5.2	+3.81	+ 7.6	-20 0.3	21 6 33.4	+ 0 54.8	-0.3838	0.5778	+0.1514	+ 8	-65
57 Sagittarii	6.1	3.83	8.4	19 18.1	8 58.3	+ 3 14.2	-0.7261	0.5762	0.1564	- 9	-90
π Capricorni	5.1	3.97	11.7	18 32.6	23 45.6	- 6 31.3	+1.0309	0.5664	0.1844	+71	+20
ρ Capricorni	5.3	3.98	12.0	18 8.8	22 0 25.7	- 5 52.6	+0.7531	0.5660	0.1855	+69	+ 1
τ Capricorni	7.0	3.94	13.8	15 29.8	4 7.1	- 2 19.2	-1.2433	0.5644	0.1916	-44	-90
τ Capricorni	5.6	+3.94	+14.0	-15 18.5	4 57.2	- 1 31.0	-1.2741	0.5643	+0.1929	-48	-90
9 Aquarii	6.8	4.01	16.3	13 55.5	14 33.0	+ 7 44.5	-0.7622	0.5571	0.2071	- 6	-90
18 Aquarii	5.7	4.10	18.2	13 18.7	23 0 52.3	- 6 13.7	+0.8179	0.5510	0.2198	+77	+ 4
B. A. C. 7562	5.5	4.11	21.1	9 30.0	10 23.1	+ 2 53.8	-0.9348	0.5462	0.2294	-13	-90
α Capricorni	5.5	4.10	21.1	9 32.7	10 25.3	+ 2 55.9	-0.8800	0.5462	0.2294	-10	-90
α Capricorni	6.4	+4.11	+21.2	- 9 44.5	11 0.2	+ 3 29.7	-0.5463	0.5459	+0.2300	+10	-75



ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

OCTOBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
B. A. C. 7620	6.5	+4.17	+21.3	-10 47.2	23 14 23.3	+ 6 46.0	+1.3065	0.5443	+0.2328	+79	+43
36 Aquarii	6.3	4.20	23.0	8 40.8	21 48.2	-10 3.8	+0.8992	0.5412	0.2382	+81	+ 8
44 Aquarii	6.4	4.20	24.0	5 53.4	24 1 26.3	- 6 32.8	-1.0928	0.5398	0.2403	+22	-90
51 Aquarii	5.8	4.20	24.7	5 20.8	4 44.9	- 3 20.6	-0.8526	0.5386	0.2420	- 6	-90
$\kappa$ Aquarii	5.2	4.24	25.7	4 44.8	11 15.6	+ 2 57.4	+0.1163	0.5366	0.2447	+46	-35
B.A.C. 7951 (mean)	6.7	+4.28	+26.0	- 4 45.0	16 5.7	+ 7 38.2	+1.3080	0.5354	+0.2461	+85	+41
$\kappa$ Piscium	4.7	4.38	28.8	+ 0 42.3	25 11 0.7	+ 1 57.2	+0.3568	0.5324	0.2470	+61	-22
9 Piscium	6.6	4.39	28.8	0 34.2	11 10.0	+ 2 6.2	+0.5349	0.5323	0.2470	+74	-13
16 Piscium	5.8	4.41	29.4	1 32.5	15 37.4	+ 6 25.2	+0.6282	0.5321	0.2461	+82	- 8
19 Piscium	4.9	4.44	29.8	2 55.7	20 29.4	+11 8.0	+0.3841	0.5320	0.2447	+63	-20
36 Piscium	6.3	+4.55	+30.8	+ 7 40.9	26 11 10.1	+ 1 21.0	-1.0194	0.5329	+0.2376	-16	-82
$\delta$ Piscium	5.3	4.57	30.8	7 37.9	13 7.5	+ 5 14.8	-0.5039	0.5331	0.2364	+14	-70
45 Piscium	6.9	4.59	30.6	7 8.2	15 35.8	+ 5 38.4	+0.5964	0.5334	0.2346	+80	- 8
75 Piscium	6.0	4.75	30.5	12 25.1	27 11 15.9	+ 0 40.8	-0.4888	0.5370	0.2169	+15	-65
$\eta$ Piscium	3.7	4.86	29.7	14 49.7	23 6.1	-11 51.8	-0.5480	0.5401	0.2026	+12	-67
101 Piscium	6.3	+4.88	+29.4	+14 8.9	28 1 8.1	- 9 53.7	+0.5806	0.5407	+0.2000	+79	- 5
103 Piscium	6.8	4.91	29.3	16 7.0	2 45.6	- 8 19.4	-1.1788	0.5411	0.1978	-31	-74
105 Piscium	6.3	4.91	29.3	15 53.8	2 57.5	- 8 7.9	-0.9073	0.5412	0.1975	-10	-74
4 Arietis	5.7	4.95	28.9	16 27.4	6 57.1	- 4 16.1	-0.7237	0.5423	0.1918	+ 1	-73
$\epsilon$ Arietis	5.7	4.99	28.4	17 19.6	11 14.2	- 0 7.5	-0.8416	0.5439	0.1856	- 6	-73
23 Arietis	7.5	+5.09	+26.9	+19 13.7	21 20.6	+ 9 38.9	-1.0736	0.5465	+0.1693	-23	-71
26 Arietis	6.0	5.12	26.1	19 24.6	29 2 37.8	- 9 14.4	-0.3975	0.5480	0.1602	+19	-52
B. A. C. 782	7.0	5.11	25.9	18 26.2	4 0.3	- 7 54.6	+0.8066	0.5483	0.1577	+90	+17
$\mu$ Arietis	6.0	5.18	25.1	19 35.0	8 0.4	- 4 2.6	+0.2517	0.5494	0.1505	+56	-16
47 Arietis	6.0	5.23	23.7	20 16.0	15 8.9	+ 2 21.5	+0.5479	0.5512	0.1370	+78	+ 1
$\zeta$ Arietis	4.8	+5.25	+22.1	+20 40.3	22 46.1	+10 13.1	+1.1002	0.5528	+0.1219	+90	+38
66 Arietis	6.0	5.32	20.6	22 27.5	30 4 50.3	- 7 55.3	-0.1226	0.5540	0.1093	+34	-31
9 Tauri	7.0	5.34	19.6	22 52.7	8 39.5	- 4 14.0	-0.1743	0.5546	0.1013	+31	-34
8 Pleiadum	6.3	5.39	18.6	23 58.4	12 8.9	- 0 51.7	-1.0190	0.5550	0.0938	-21	-66
17 Tauri	4.3	5.38	18.7	23 47.9	12 11.0	- 0 49.7	-0.8252	0.5550	0.0937	- 7	-66
19 Tauri	5.0	+5.39	+18.6	+24 9.1	12 19.6	- 0 41.4	-1.1958	0.5551	+0.0934	-39	-66
20 Tauri	5.0	5.39	18.6	24 3.2	12 36.2	- 0 25.4	-1.0637	0.5551	0.0928	-25	-66
22 Tauri	7.0	5.40	18.6	24 12.9	12 42.0	- 0 19.8	-1.2283	0.5551	0.0926	-44	-66
23 Tauri	4.7	5.38	18.6	23 38.1	12 50.1	- 0 12.0	-0.5894	0.5551	0.0923	+ 7	-58
$\eta$ Tauri	3.1	5.38	18.4	23 47.7	13 21.0	+ 0 17.9	-0.7147	0.5553	0.0912	0	-66
B. A. C. 1170	6.3	+5.36	+18.4	+23 6.8	13 44.8	+ 0 40.9	+0.0599	0.5553	+0.0903	+44	-20
26 Tauri	7.0	5.37	18.3	23 33.0	14 0.5	+ 0 56.0	-0.3894	0.5553	0.0898	+19	-45
27 Tauri	4.0	5.38	18.2	23 44.8	14 6.1	+ 1 1.4	-0.5945	0.5553	0.0896	+ 7	-58
28 Tauri	6.2	5.38	18.2	23 49.8	14 6.7	+ 1 2.0	-0.6839	0.5553	0.0895	+ 2	-64
33 Tauri	6.3	5.36	17.5	22 53.0	17 39.0	+ 4 27.0	+0.6443	0.5556	0.0818	+90	+12
B. A. C. 1238	6.3	+5.38	+17.0	+22 55.1	19 22.9	+ 6 7.3	+0.7453	0.5557	+0.0780	+90	+18
36 Tauri	6.0	5.38	16.6	23 49.8	20 53.4	+ 7 34.6	-0.1280	0.5558	0.0746	+33	-28
62 Tauri	6.0	5.40	14.3	24 4.0	31 5 38.4	- 7 58.4	+0.1812	0.5561	0.0550	+52	-10
95 Tauri	6.3	5.37	12.0	23 53.9	14 13.0	+ 0 18.3	+0.7545	0.5557	0.0356	+90	+24
99 Tauri	6.0	5.35	10.3	23 47.5	20 43.8	+ 6 35.7	+1.0564	0.5550	0.0207	+90	+44
$\delta$ Tauri	6.0	+5.39	+10.1	+24 53.7	20 51.8	+ 6 43.4	-0.1486	0.5550	+0.0204	+32	-24

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103 Tauri	6.0	+5.34	+ 9.0	+24 8.0	1 1 20.0	+11 2.3	+0.7555	0.5544	+0.0102	+90	+25
118 Tauri	5.7	5.33	6.2	25 4.2	10 49.6	- 3 47.6	-0.2767	0.5525	-0.0112	+25	-31
121 Tauri	6.0	5.27	5.7	23 58.5	13 38.3	- 1 4.7	+0.8878	0.5518	0.0175	+90	+31
125 Tauri	6.0	5.33	4.7	25 50.5	15 32.2	+ 0 45.4	-1.2040	0.5513	0.0218	-43	-64
132 Tauri	5.3	5.25	3.7	24 32.0	19 46.6	+ 4 51.0	+0.1216	0.5501	0.0311	+48	-11
1 Geminorum	5.0	+5.15	+ 2.2	+23 16.2	2 2 41.8	+11 32.3	+1.2485	0.5479	-0.0462	+90	+61

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$		d h m	h m					
2 Geminorum	7.2	+5.15	+ 1.8	+23 38.9	2 3 55.4	-11 16.6	+0.7728	0.5474	-0.0488	+90	+23
3 Geminorum	6.3	5.13	1.7	23 7.8	5 16.5	-9 58.1	+1.2765	0.5469	0.0517	+90	+65
5 Geminorum	6.7	5.18	1.0	24 26.6	6 4.7	-9 11.6	-0.2136	0.5467	0.0522	+29	-31
8 Geminorum	6.5	5.13	0.5	24 0.2	8 17.4	-7 3.3	+0.1488	0.5459	0.0581	+50	-12
9 Geminorum	6.3	5.12	0.5	23 46.5	8 36.0	-6 45.4	+0.3818	0.5458	0.0587	+65	0
10 Geminorum	7.0	+5.11	+ 0.2	+23 38.4	9 29.6	-5 53.5	+0.4768	0.5454	-0.0606	+73	+ 5
11 Geminorum	7.3	5.10	+ 0.2	23 30.6	9 41.3	-5 42.2	+0.6097	0.5453	0.0610	+86	+12
44 Geminorum	6.0	4.86	- 5.0	22 47.3	8 7 17.5	-8 48.6	-0.3799	0.5364	0.1038	+19	-46
8 Geminorum	3.5	4.76	6.5	22 10.1	14 25.1	-1 54.6	-0.4803	0.5333	0.1167	+14	-54
56 Geminorum	5.6	4.70	6.2	20 38.1	15 20.0	-1 1.5	+1.1106	0.5329	0.1184	+90	+39
61 Geminorum	6.0	+4.67	- 6.7	+20 27.6	17 45.1	+ 1 19.0	+1.0127	0.5318	-0.1226	+90	+30
63 Geminorum	5.7	4.71	7.3	21 39.1	18 7.2	+ 1 40.4	-0.3526	0.5317	0.1233	+21	-46
79 Geminorum	6.3	4.56	8.8	20 33.5	4 2 39.3	+9 56.4	-0.2562	0.5279	0.1376	+26	-42
85 Geminorum	6.0	4.49	9.6	20 9.0	7 51.8	-9 0.7	-0.5430	0.5256	0.1459	+11	-61
B. A. C. 2658	7.2	4.41	9.7	18 31.3	10 23.5	-6 33.7	+0.8858	0.5246	0.1498	+90	+18
$\zeta^1$ Cancri	4.8	+4.33	-10.8	+17 57.1	16 10.1	-0 57.7	+0.6264	0.5222	-0.1584	+85	+ 2
$d^1$ Cancri	6.0	4.28	12.2	18 39.4	21 47.8	+ 4 29.8	-1.0654	0.5200	0.1664	-23	-71
B. A. C. 2810	7.0	4.24	11.8	17 30.7	22 31.2	+ 5 11.8	+0.0776	0.5197	0.1674	+45	-28
$a^2$ Cancri	6.0	4.22	11.9	17 22.7	23 4.8	+ 5 44.4	+0.1304	0.5195	0.1681	+48	-25
54 Cancri	6.3	4.02	13.5	15 43.5	5 12 1.0	-5 42.5	-0.3278	0.5150	0.1847	+23	-52
$o^1$ Cancri	5.7	+3.99	-14.0	+15 42.6	15 13.9	-2 35.4	-0.9110	0.5141	-0.1885	-10	-74
$o^2$ Cancri	6.0	3.99	14.1	15 58.1	15 24.1	-2 25.5	-1.2282	0.5140	0.1887	-36	-74
$\xi$ Leonis	5.3	3.68	15.4	11 44.8	6 9 27.5	-8 53.6	-0.1672	0.5098	0.2074	+32	-46
$\sigma$ Leonis	3.8	3.59	15.7	10 21.1	14 20.4	-4 9.2	+0.3374	0.5091	0.2118	+60	-20
10 Sextantis	6.0	3.49	16.2	9 24.7	22 26.6	+ 3 43.0	-0.3782	0.5083	0.2183	+21	-60
11 Sextantis	6.0	+3.47	-16.1	+ 8 47.8	23 20.5	+ 4 45.3	+0.0967	0.5083	-0.2190	+46	-33
$\pi$ Leonis	5.0	3.45	16.2	8 31.7	7 0 27.3	+ 5 40.3	+0.1438	0.5082	0.2198	+49	+31
16 Sextantis	6.9	3.38	16.0	6 40.0	5 16.2	+10 20.9	+1.1046	0.5081	0.2231	+90	+24
43 Leonis	6.5	3.30	17.0	7 3.3	12 34.2	-6 33.7	-0.9639	0.5084	0.2276	-12	-83
34 Sextantis	6.7	3.15	16.7	4 6.7	22 59.4	+ 3 33.5	-0.1761	0.5094	0.2327	+31	-50
36 Sextantis	6.6	+3.13	-16.5	+ 3 1.2	8 0 19.9	+ 4 51.7	+0.6881	0.5097	-0.2333	+89	- 4
55 Leonis	6.2	3.07	16.3	1 16.6	5 53.6	+10 15.7	+1.2598	0.5107	0.2353	+90	+36
$p^3$ Leonis	5.4	3.01	16.4	0 32.6	10 3.2	-9 41.9	+1.0618	0.5118	0.2365	+90	+19
$p^6$ Leonis	5.7	2.97	16.7	+ 0 28.8	15 21.3	-4 33.1	-0.1290	0.5133	0.2376	+34	-48
$e$ Leonis	5.3	2.88	16.5	-2 26.7	23 56.1	+ 3 46.5	+0.9469	0.5164	0.2385	+88	-11
B. A. C. 4006	6.1	+2.78	-16.5	- 4 46.3	9 10 31.0	-9 57.5	-0.8857	0.5211	-0.2379	+85	+ 7
9 Virginis	5.7	2.63	16.2	8 53.7	10 7 39.4	+10 31.6	+0.2446	0.5337	0.2305	+52	-28
75 Virginis	6.0	2.53	14.9	14 50.6	11 11 5.5	-10 56.7	+0.3700	0.5551	0.2061	+56	-21
83 Virginis	6.0	+2.53	-14.5	-15 40.2	16 14.3	-5 58.6	+0.1744	0.5595	0.1994	+43	-31
NEW MOON.					14 9 57.3	+ 9 11.5	-0.7377	0.5477	-0.0407	-21	-90
MERCURY				-23 33.6	10 28.2	+ 9 41.2	+0.5638	0.6078	0.0523	+53	- 8
22 Scorpii	5.5	+2.83	- 8.2	24 53.6	16 39.5	-8 23.1	+0.7458	0.6096	0.0341	+65	+ 3
25 Scorpii	7.0	2.89	7.3	25 20.7	17 44.6	-7 20.7	-0.1671	0.6098	0.0306	+ 8	-51
18 Ophiuchi	6.7	2.90	7.2	24 27.8	21 35.6	-3 39.5	+0.1005	0.6105	0.0193	+22	-34
26 Ophiuchi	6.1	2.92	6.4	24 50.1	23 16.1	-2 3.2	+0.7417	0.6107	-0.0142	+65	+ 3
31 Ophiuchi	6.7	+2.95	- 6.2	-25 30.1	4 12.6	+ 2 40.7	-0.6154	0.6109	+0.0007	-18	-87
39 Ophiuchi ( <i>S. star</i> )	6.0	2.96	5.2	24 10.3	4 14.8	+ 2 42.8	-0.8243	0.6109	0.0008	-30	-90
B. A. C. 5831	6.9	2.96	5.2	23 57.7	5 33.5	+ 3 58.2	+0.0174	0.6109	0.0048	+16	-40
B. A. C. 5846	6.8	2.99	5.0	24 48.3	5 40.4	+ 4 4.8	+0.1130	0.6109	0.0051	+21	-34
8 Ophiuchi	3.3	2.98	5.0	24 54.0	6 49.7	+ 5 11.1	-0.6232	0.6109	+0.0086	-18	-88
B. A. C. 5868	7.0	+2.99	- 4.7	-24 9.1	7 17.9	+ 5 38.2	-0.6873	0.6109	0.0101	-22	-90
8 Ophiuchi	4.4	3.00	4.7	24 5.0	9 10.0	+ 7 25.5	-0.8600	0.6107	0.0157	-31	-90
63 Ophiuchi	5.2	3.00	4.2	23 53.1	17 51.9	-8 15.4	+0.3660	0.6092	0.0417	+39	-20
B. A. C. 6066	6.6	3.11	2.7	24 51.9	18 41.7	-7 26.9	-0.5337	0.6090	0.0443	-10	-78
4 Sagittarii	5.4	+3.11	- 2.2	-24 48.4	19 41.4	-6 29.8	-0.6056	0.6086	+0.0472	-14	-85

ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels.	
Name.	Magn.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.		
		Δα	Δδ										
		s	"	°	d h m	h m				°	°		
5 Sagittarii	7.0	+3.12	- 2.2	-24 16.6	15 19 49.7	- 6 21.7	-0.1322	0.6086	+0.0476	+11	-49		
7 Sagittarii	5.9	3.13	2.0	24 16.9	20 49.2	- 5 24.8	-0.0781	0.6083	0.0505	+15	-45		
9 Sagittarii	6.0	3.13	1.9	24 21.8	21 12.0	- 5 2.9	+0.0224	0.6082	0.0516	+20	-39		
B. A. C. 6161	5.7	3.15	- 1.3	23 43.4	16 0 8.5	- 2 13.8	-0.4507	0.6072	0.0602	- 5	-70		
B. A. C. 6304	7.0	3.24	+ 0.3	24 11.0	8 13.4	+ 5 31.0	+0.5884	0.6050	0.0831	+57	- 7		
24 Sagittarii	5.9	+3.24	+ 0.4	-24 6.5	8 28.4	+ 5 45.3	+0.5337	0.6035	+0.0839	+53	-10		
25 Sagittarii	6.3	3.25	0.4	24 18.0	8 43.1	+ 5 59.4	+0.7453	0.6034	0.0845	+66	+ 2		
B. A. C. 6343	6.3	3.25	0.9	23 35.5	10 14.0	+ 7 26.6	+0.1714	0.6026	0.0887	+31	-31		
26 Sagittarii	6.6	3.28	1.0	23 55.7	11 29.9	+ 8 39.4	+0.6210	0.6019	0.0922	+60	+ 5		
28 Sagittarii	5.6	3.25	1.8	22 29.9	13 13.8	+10 19.0	-0.6397	0.6010	0.0969	-11	-89		
30 Sagittarii	6.6	+3.26	+ 2.2	-22 16.7	14 57.4	+11 58.4	-0.6883	0.6001	+0.1015	-13	-90		
31 Sagittarii	7.0	3.26	2.3	22 2.4	15 27.3	-11 33.0	-0.8748	0.5997	0.1028	-24	-90		
1 <sup>st</sup> Sagittarii	5.0	3.29	2.3	22 52.2	16 13.2	-10 48.9	+0.0323	0.5993	0.1048	+25	-39		
1 <sup>st</sup> Sagittarii	5.1	3.30	2.4	22 47.9	16 34.9	-10 28.2	-0.0020	0.5990	0.1057	+24	-41		
B. A. C. 6448	6.4	3.31	2.3	23 18.2	16 55.2	-10 8.6	+0.5402	0.5989	0.1066	+55	-10		
o Sagittarii	3.8	+3.31	+ 3.3	-21 53.4	20 17.1	- 6 55.0	-0.4985	0.5966	+0.1153	- 1	-74		
π Sagittarii	3.1	3.31	4.0	21 11.1	22 16.3	- 5 0.5	-0.9687	0.5954	0.1200	-29	-90		
B. A. C. 6607	5.9	3.39	4.5	22 35.5	2 29.6	- 0 57.4	+0.9659	0.5925	0.1306	+67	+17		
50 Sagittarii	5.9	3.40	5.1	21 58.6	4 44.2	+ 1 11.9	+0.6503	0.5909	0.1360	+65	- 4		
π Capricorni	5.1	3.58	11.0	18 32.6	18 5 38.2	+ 1 8.6	+1.2606	0.5716	0.1863	+71	+42		
ρ Capricorni	5.3	+3.57	+11.3	-18 8.9	6 17.6	+ 1 46.6	+0.9855	0.5711	+0.1874	+72	+16		
B. A. C. 7044	7.0	3.58	11.1	18 12.4	6 21.2	+ 1 50.0	+1.0568	0.5711	0.1877	+72	+22		
τ <sup>1</sup> Capricorni	7.0	3.51	12.8	15 29.8	9 55.6	+ 5 16.6	-0.9922	0.5683	0.1934	-22	-90		
τ <sup>2</sup> Capricorni	5.6	3.55	13.0	15 18.5	10 45.0	+ 6 4.2	-1.0221	0.5675	0.1947	-24	-90		
8 Aquarii	6.8	3.59	15.2	13 26.7	19 41.6	- 9 18.5	-1.1077	0.5608	0.2076	-29	-90		
9 Aquarii	6.8	+3.61	+15.3	-13 55.5	20 13.3	- 8 47.9	-0.5120	0.5604	+0.2083	+ 8	-73		
18 Aquarii	5.7	3.71	17.0	13 18.7	19 6 27.0	+ 1 4.5	+1.0617	0.5531	0.2204	+77	+20		
B. A. C. 7562	5.5	3.73	19.8	9 30.0	15 54.7	+10 12.8	-0.6851	0.5470	0.2293	+ 2	-90		
1 <sup>st</sup> Capricorni	5.5	3.73	19.8	9 32.7	15 56.9	+10 14.9	-0.6305	0.5470	0.2293	+ 5	-84		
2 <sup>nd</sup> Capricorni	6.4	3.74	19.8	9 44.5	16 31.7	+10 48.6	-0.2978	0.5465	0.2298	+22	-58		
30 Aquarii	5.8	+3.78	+21.8	- 7 0.6	20 0 26.2	- 5 32.7	-1.2487	0.5421	+0.2355	-37	-90		
36 Aquarii	6.3	3.84	21.5	8 40.9	3 18.7	- 2 46.0	+1.1412	0.5406	0.2372	+81	+25		
44 Aquarii	6.4	3.83	22.6	5 53.4	6 57.0	+ 0 45.2	-0.8511	0.5388	0.2391	- 6	-90		
51 Aquarii	5.8	3.86	23.4	5 20.8	10 16.5	+ 3 58.3	-0.6118	0.5373	0.2406	+ 8	-81		
κ Aquarii	5.2	3.91	24.2	- 4 44.8	16 48.4	+10 17.6	+0.3512	0.5346	0.2429	+60	-22		
κ Piscium	4.7	+4.13	+27.6	+ 0 42.3	21 16 45.6	+ 9 29.6	+0.5677	0.5285	+0.2438	+77	-11		
9 Piscium	6.6	4.13	27.6	0 34.2	16 55.0	+ 9 38.7	+0.7464	0.5285	0.2438	+90	- 1		
16 Piscium	5.8	4.16	28.4	1 32.5	21 25.6	- 9 59.2	+0.8312	0.5280	0.2427	+90	+ 4		
19 Piscium	4.9	4.21	29.0	2 55.7	22 2 41.4	+ 5 12.6	+0.5818	0.5276	0.2412	+78	-10		
36 Piscium	6.3	4.37	30.5	7 40.9	17 15.0	- 9 13.3	-0.8536	0.5279	0.2337	- 6	-82		
δ Piscium	5.3	+4.40	+30.5	+ 7 37.9	19 14.1	+11 8.8	-0.3388	0.5280	+0.2324	+23	-59		
45 Piscium	6.9	4.43	30.2	7 8.2	21 44.7	-10 25.3	+0.7642	0.5283	0.2306	+90	+ 2		
75 Piscium	6.0	4.69	30.8	12 25.1	23 17 44.1	+ 8 56.6	-0.3659	0.5320	0.2129	+21	-57		
7 Piscium	3.7	4.86	30.2	14 49.7	24 5 45.8	- 3 24.6	-0.4494	0.5353	0.1989	+16	-61		
101 Piscium	6.3	4.89	29.9	14 8.9	7 49.8	- 1 24.5	+0.6833	0.5359	0.1962	+90	+ 1		
103 Piscium	6.8	+4.94	+30.1	+16 7.0	9 28.8	+ 0 11.3	-1.0922	0.5364	+0.1940	-24	-74		
105 Piscium	6.3	4.94	30.0	15 53.8	9 40.9	+ 0 23.0	-0.8192	0.5365	0.1938	- 5	-74		
3 Arietis	6.0	5.00	29.9	16 54.6	12 58.4	+ 3 34.2	-1.2706	0.5375	0.1893	-42	-73		
4 Arietis	5.7	5.00	29.7	16 27.4	13 44.3	+ 4 18.7	-0.6421	0.5377	0.1882	+ 6	-71		
1 Arietis	5.7	5.06	29.3	17 19.7	18 5.2	+ 8 31.1	-0.7692	0.5391	0.1820	- 2	-73		
θ Arietis	5.7	+5.22	+28.2	+19 26.2	25 3 51.3	- 6 1.9	-1.3272	0.5424	+0.1669	-59	-71		
23 Arietis	7.5	5.21	28.0	19 13.7	4 20.1	- 5 34.1	-1.0240	0.5426	0.1661	-20	-71		
26 Arietis	6.0	5.28	27.2	19 24.6	9 41.6	- 0 23.1	-0.3539	0.5443	0.1571	+21	-50		
B. A. C. 782	7.0	5.27	26.9	18 26.3	11 5.1	+ 0 57.6	+0.9089	0.5448	0.1547	+90	+20		
μ Arietis	6.0	5.36	26.1	19 35.0	15 8.1	+ 4 52.6	+0.2882	0.5461	0.1476	+58	-14		
47 Arietis	6.0	+5.46	+24.8	+20 16.0	22 21.4	+11 51.5	+0.5715	0.5483	+0.1343	+80	+ 2		

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

## NOVEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
$\epsilon$ Arietis	4.6	+5.47	+24.8	+20 56.4	25 22 52.7	-11 38.3	-0.0851	0.5485	+0.1333	+36	-32
$\zeta$ Arietis	4.8	5.52	23.1	20 40.4	26 6 3.2	-4 42.2	+1.1113	0.5506	0.1194	+90	+39
66 Arietis	6.0	5.63	21.8	22 27.5	12 10.6	+1 12.7	-0.1287	0.5521	0.1071	+34	-32
9 Tauri	7.0	5.69	20.8	22 52.7	16 1.6	+4 55.8	-0.1885	0.5530	0.0991	+30	-34
8 Pleiadum	6.3	5.76	20.0	23 58.4	19 32.5	+8 19.6	-1.0434	0.5537	0.0917	-23	-66
17 Tauri	4.3	+5.75	+20.0	+23 47.9	19 34.5	+8 21.5	-0.8491	0.5537	+0.0916	-9	-66
19 Tauri	5.0	5.76	19.9	24 9.2	19 43.2	+8 29.9	-1.2213	0.5538	0.0913	-43	-66
20 Tauri	5.0	5.76	19.8	24 3.3	20 0.0	+8 46.1	-1.0891	0.5538	0.0907	-28	-66
21 Tauri	7.0	5.77	19.8	24 14.5	20 2.1	+8 48.2	-1.2892	0.5538	0.0906	-64	-66
22 Tauri	7.0	5.77	19.8	24 12.9	20 5.9	+8 51.8	-1.2546	0.5538	0.0905	-49	-66
23 Tauri	4.7	+5.75	+19.8	+23 38.2	20 13.9	+8 59.5	-0.6133	0.5538	+0.0902	+6	-60
7 Tauri	3.1	5.74	19.7	23 47.7	20 45.1	+9 29.7	-0.7398	0.5539	0.0891	-2	-66
B. A. C. 1170	6.3	5.74	19.5	23 6.8	21 9.1	+9 52.9	+0.0371	0.5540	0.0883	+43	-21
26 Tauri	7.0	5.75	19.5	23 33.0	21 24.8	+10 8.0	-0.4146	0.5541	0.0877	+17	-46
27 Tauri	4.0	5.76	19.5	23 44.8	21 30.5	+10 13.5	-0.6207	0.5541	0.0875	+5	-60
28 Tauri	6.2	+5.76	+19.5	+23 49.8	21 31.0	+10 14.0	-0.7106	0.5541	+0.0875	0	-66
33 Tauri	6.3	5.75	18.5	23 53.1	27 1 4.7	-10 19.6	+0.6166	0.5547	0.0798	+86	+11
B. A. C. 1238	6.3	5.80	18.1	22 55.1	2 49.1	-8 38.8	+0.7145	0.5549	0.0760	+90	+17
36 Tauri	6.0	5.80	17.7	23 49.8	4 20.2	-7 10.9	-0.1647	0.5551	0.0727	+31	-30
62 Tauri	6.0	5.86	15.2	24 4.0	13 7.6	+1 18.5	+0.1300	0.5560	0.0532	+48	-12
95 Tauri	6.3	+5.90	+12.6	+23 53.9	21 43.8	+9 36.8	+0.6897	0.5561	+0.0338	+90	+19
99 Tauri	6.0	5.91	10.8	23 47.5	23 4 15.4	-8 5.0	+0.9814	0.5558	0.0191	+90	+39
4 Tauri	6.0	5.96	10.6	24 53.7	4 23.4	-7 57.3	-0.2268	0.5558	0.0188	+27	-29
103 Tauri	6.0	5.93	9.3	24 8.0	8 51.9	-3 38.0	+0.6719	0.5554	+0.0086	+90	+21
118 Tauri	5.7	5.98	6.4	25 4.2	18 21.8	+5 32.3	-0.3775	0.5539	-0.0128	+19	-37
121 Tauri	6.0	+5.93	+5.6	+23 58.4	21 10.4	+8 15.2	+0.7847	0.5533	-0.0191	+90	+26
132 Tauri	5.3	5.94	3.5	24 32.0	29 3 18.6	-9 49.3	+0.0078	0.5518	0.0327	+41	-17
1 Geminorum	5.0	5.87	1.5	23 16.2	10 13.5	-3 8.3	+1.1264	0.5497	0.0477	+90	+47
2 Geminorum	7.2	5.88	1.1	23 38.9	11 26.9	-1 57.4	+0.6482	0.5493	0.0503	+90	+15
3 Geminorum	6.3	5.85	0.8	23 7.8	12 48.0	-0 39.0	+1.1507	0.5488	0.0532	+90	+49
4 Geminorum	7.4	+5.84	+0.6	+23 0.9	13 9.3	-0 18.4	+1.2595	0.5487	-0.0540	+90	+62
5 Geminorum	6.7	5.91	+0.3	24 26.5	13 36.1	+0 7.4	-0.3426	0.5486	0.0549	+21	-39
8 Geminorum	6.5	5.88	-0.3	24 0.1	15 48.7	+2 15.6	+0.0171	0.5478	0.0596	+42	-19
9 Geminorum	6.3	5.87	0.4	23 46.5	16 7.2	+2 33.4	+0.2501	0.5477	0.0602	+56	-7
10 Geminorum	7.0	5.86	0.6	23 38.4	17 0.8	+3 25.3	+0.3440	0.5474	0.0621	+62	-2
11 Geminorum	7.3	+5.86	-0.6	+23 30.6	17 12.5	+3 36.6	+0.4768	0.5473	-0.0625	+75	+5
4 Geminorum	6.0	5.70	4.8	21 52.8	30 8 16.9	-5 48.7	+1.1081	0.5411	0.0929	+90	+41
44 Geminorum	6.0	5.69	6.8	22 47.2	14 47.3	+0 28.9	-0.5430	0.5382	0.1052	+10	-56
6 Geminorum	3.5	5.61	8.8	22 10.1	21 54.8	+7 22.8	-0.6508	0.5348	0.1182	+4	-65
56 Geminorum	5.7	+5.54	-8.6	+20 38.0	22 49.7	+8 16.0	+0.9420	0.5344	-0.1192	+90	+26

## DECEMBER.

61 Geminorum	6.0	+5.52	-9.2	+20 27.5	1 1 14.8	+10 36.4	+0.8419	0.5332	-0.1239	+90	+19
63 Geminorum	5.7	+5.56	-9.7	+21 39.1	1 37.0	+10 57.9	-0.5273	0.5331	-0.1245	+11	-57
79 Geminorum	6.3	5.43	11.6	20 33.5	10 9.5	-4 45.7	-0.4394	0.5289	0.1387	+16	-53
85 Geminorum	6.0	5.35	12.8	20 9.0	15 22.6	+0 17.7	-0.7320	0.5264	0.1469	0	-70
B. A. C. 2658	7.2	5.28	13.0	18 31.3	17 54.7	+2 45.1	+0.6984	0.5252	0.1507	+90	+7
51 Cancri	4.8	5.21	14.3	17 57.0	23 42.4	+8 22.2	+0.4334	0.5225	0.1592	+68	-8
41 Cancri	6.0	+5.17	-15.8	+18 39.3	2 5 21.5	-10 8.9	-1.2700	0.5199	-0.1670	-44	-71
B. A. C. 2810	7.0	5.13	15.6	17 30.6	6 5.1	-9 26.7	-0.1220	0.5196	0.1679	+34	-39
42 Cancri	6.0	5.11	15.7	17 22.7	6 38.9	-8 53.9	-0.0696	0.5194	0.1687	+37	-36
54 Cancri	6.3	4.92	17.7	15 43.4	19 40.1	+3 44.2	-0.5399	0.5140	0.1848	+11	-66
61 Cancri	5.7	4.89	18.4	15 42.5	22 54.5	+6 52.9	-1.1260	0.5128	0.1884	-26	-74
5 Leonis	5.3	+4.57	-20.3	+11 44.7	3 17 19.7	+0 46.3	-0.3854	0.5071	-0.2064	+20	-59

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels.	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	X	Y	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
$\alpha$ Leonis	3.8	+4.50	-20.7	+10 21.0	8 22 16.5	+ 5 34.7	+0.1220	0.5060	-0.2105	+47	-31
10 Sextantis	6.0	4.38	21.4	9 24.6	4 6 29.9	-10 25.9	-0.5993	0.5045	0.2166	+ 9	-75
11 Sextantis	6.0	4.37	21.3	8 47.7	7 24.8	- 9 32.6	-0.1211	0.5044	0.2172	+34	-45
$\pi$ Leonis	5.0	4.35	21.4	8 31.7	8 32.6	- 8 26.7	-0.0733	0.5043	0.2180	+37	-43
16 Sextantis	6.9	4.27	21.3	6 39.9	13 26.4	- 3 41.2	+0.8959	0.5038	0.2211	+90	+10
43 Leonis	6.5	+4.19	-22.4	+ 7 3.2	20 52.5	+ 3 32.3	-1.1896	0.5035	-0.2252	-29	-83
34 Sextantis	6.7	4.02	22.1	4 6.6	5 7 30.1	-10 8.0	-0.3906	0.5039	0.2298	+20	-63
36 Sextantis	6.6	4.00	21.9	3 1.1	8 52.4	- 8 47.9	+0.4822	0.5040	0.2303	+70	-15
55 Leonis	6.2	3.93	21.7	1 16.5	14 33.2	- 3 16.8	+1.0628	0.5048	0.2320	+90	+19
$\rho^2$ Leonis	5.4	3.87	21.8	0 32.5	18 48.4	+ 0 51.2	+0.8660	0.5055	0.2330	+90	+ 6
$\rho^3$ Leonis	5.7	+3.82	-22.1	+ 0 28.7	6 0 13.8	+ 6 7.3	-0.3332	0.5068	-0.2340	+23	-60
$\epsilon$ Leonis	5.3	3.72	21.7	- 1 26.8	9 0.8	- 9 20.8	+0.7611	0.5095	0.2346	+80	- 0
B. A. C. 4006	6.1	3.62	21.3	4 46.3	19 51.2	+ 1 10.7	+0.7094	0.5140	0.2338	+85	- 3
$\eta$ Virginis	5.7	3.42	20.4	8 53.7	7 17 29.9	- 1 49.7	+0.0878	0.5265	0.2262	+43	-36
75 Virginis	6.0	3.25	17.9	14 50.6	8 21 30.1	+ 1 16.1	+0.2547	0.5491	0.2024	+49	-27
83 Virginis	6.0	+3.23	-17.3	-15 40.3	9 2 44.2	+ 6 19.4	+0.0657	0.5539	-0.1960	+37	-37
85 Virginis	6.5	3.21	17.4	15 15.6	3 13.7	+ 6 47.9	-0.4543	0.5544	0.1954	+10	-69
B. A. C. 4722	5.8	3.16	15.9	17 43.8	16 13.3	- 4 40.0	-0.3350	0.5668	0.1760	+14	-61
42 Libræ	5.7	3.16	10.8	23 29.4	11 2 25.7	+ 4 13.6	+0.6214	0.5986	0.1032	+61	- 5
B. A. C. 5253	5.8	3.16	10.1	24 13.9	7 36.6	+ 9 11.8	+0.8615	0.6027	0.0892	+66	+10
B. A. C. 5254	5.8	+3.15	-10.2	-23 40.6	7 37.9	+ 9 13.0	+0.3060	0.6027	-0.0891	+39	-23
$\rho$ Ophiuchi ( <i>S. star</i> )	5.0	+3.14	- 4.2	-23 12.8	19 29.0	- 3 25.6	-1.0181	0.6103	-0.0560	-39	-90
NEW MOON.											
B. A. C. 6304	7.0	+3.26	+ 1.0	-24 11.0	18 17 57.5	- 6 57.0	+0.6445	0.6151	+0.0860	+61	- 4
24 Sagittarii	5.9	+3.26	+ 1.1	-24 6.5	18 12.0	- 6 43.1	+0.5887	0.6132	+0.0859	+57	- 7
25 Sagittarii	6.3	3.28	1.2	24 18.0	18 26.3	- 6 29.4	+0.7978	0.6131	0.0871	+66	+ 6
B. A. C. 6343	6.3	3.25	1.5	23 35.9	19 54.5	- 5 4.9	+0.2338	0.6124	0.0914	+35	-27
MERCURY				23 23.4	20 4.7	- 4 55.2	+0.0487	0.6284	0.0805	+24	-37
26 Sagittarii	6.6	3.27	1.5	23 55.7	21 8.1	- 3 54.4	+0.6785	0.6119	0.0949	+64	- 2
28 Sagittarii	5.6	+3.24	+ 2.2	-22 20.9	22 48.9	- 2 18.0	-0.5617	0.6110	+0.0974	- 7	-80
30 Sagittarii	6.6	3.24	2.6	22 16.7	14 0 29.3	- 0 41.7	-0.6073	0.6102	0.1044	- 9	-85
31 Sagittarii	7.0	3.24	2.7	22 2.4	0 58.3	- 0 13.9	-0.7903	0.6099	0.1057	-20	-90
$\nu^1$ Sagittarii	5.0	3.26	2.8	22 52.1	1 42.9	+ 0 28.8	+0.1038	0.6095	0.1078	+29	-35
$\nu^2$ Sagittarii	5.1	3.27	2.9	22 47.9	2 3.8	+ 0 48.7	+0.0707	0.6093	0.1087	+28	-37
B. A. C. 6448	6.4	+3.28	+ 2.9	-23 18.3	2 23.5	+ 1 7.7	+0.6047	0.6092	+0.1096	+60	- 7
$\alpha$ Sagittarii	3.8	3.26	3.7	21 53.4	5 39.0	+ 4 14.9	-0.4135	0.6073	0.1185	+ 3	-67
$\pi$ Sagittarii	3.1	3.25	4.2	21 11.1	7 34.4	+ 6 5.5	-0.8740	0.6061	0.1236	-23	-90
B. A. C. 6607	5.9	3.30	4.9	22 35.5	11 39.3	+10 0.3	+1.0349	0.6034	0.1341	+67	+22
50 Sagittarii	5.9	3.30	5.4	21 58.7	13 49.4	-11 54.9	+0.7280	0.6019	0.1395	+68	0
$\rho$ Capricorni	5.3	+3.36	+10.9	-18 8.9	15 14 29.7	+11 46.6	+1.0819	0.5822	+0.1919	+72	+24
B. A. C. 7044	7.0	3.37	10.8	18 12.4	14 33.1	+11 49.8	+1.1516	0.5822	0.1920	+72	+30
$\tau^1$ Capricorni	7.0	3.34	12.2	15 29.8	18 0.0	- 8 51.1	-0.8592	0.5793	0.1978	-13	-90
$\tau^2$ Capricorni	5.6	3.33	12.4	15 18.6	18 47.7	- 8 5.3	-0.8880	0.5786	0.1992	-15	-90
8 Aquarii	6.8	3.36	14.2	13 26.7	16 3 25.7	+ 0 13.4	-0.9652	0.5713	0.2125	-18	-90
9 Aquarii	6.8	+3.37	+14.2	-13 55.5	3 56.3	+ 0 42.8	-0.3792	0.5709	+0.2128	+15	-63
18 Aquarii	5.7	3.45	15.9	13 18.7	13 49.4	+10 14.5	+1.1758	0.5630	0.2248	+77	+30
B. A. C. 7562	5.5	3.45	18.4	9 30.0	22 58.9	+ 4 55.4	-0.5388	0.5561	0.2334	+10	-75
$\epsilon^1$ Capricorni	5.5	3.45	18.4	9 32.7	23 1.1	- 4 53.3	-0.4847	0.5560	0.2334	+13	-71
$\epsilon^2$ Capricorni	6.4	3.46	18.4	9 44.5	23 34.9	- 4 20.6	-0.1566	0.5556	0.2339	+30	-49
30 Aquarii	5.8	+3.49	+20.2	- 7 0.6	17 7 15.0	+ 3 3.7	-1.0905	0.5504	+0.2392	-23	-90
36 Aquarii	6.3	3.54	20.1	8 40.9	10 2.7	+ 5 45.7	+1.2654	0.5486	0.2408	+81	+37
44 Aquarii	6.4	3.55	21.0	5 53.4	13 35.0	+ 9 10.8	-0.6983	0.5464	0.2426	+ 2	-90
51 Aquarii	5.8	3.56	21.8	5 20.8	16 49.3	-11 41.3	-0.4615	0.5445	0.2439	+15	-69
$\kappa$ Aquarii	5.2	3.60	22.4	4 44.9	23 11.2	- 5 32.1	+0.4893	0.5411	0.2458	+70	-15
3 Piscium	6.4	+3.69	+25.1	- 0 21.3	18 10 1.3	+ 4 56.8	-1.3220	0.5363	+0.2469	-43	-90

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.							Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle H	Y	x'	y'	N.	S.		
		$\Delta\alpha$	$\Delta\delta$										
$\kappa$ Piscium	4.7	+3.83	+26.0	+ 0 42.3	18 22 39.9	- 6 48.8	+0.7034	0.5321	+0.2452	+90	- 3		
9 Piscium	6.6	3.83	26.0	0 34.1	22 49.1	- 6 39.9	+0.8831	0.5321	0.2452	+90	+ 7		
16 Piscium	5.8	3.86	26.8	1 32.4	19 3 15.9	- 2 21.5	+0.9644	0.5311	0.2438	+90	+13		
19 Piscium	4.9	3.92	27.3	2 55.7	8 7.8	+ 2 21.2	+0.7164	0.5301	0.2419	+90	- 2		
$\omega$ Piscium	4.2	4.01	28.6	6 18.4	14 25.9	+ 8 27.5	-1.2771	0.5292	0.2387	-38	-84		
36 Piscium	6.3	+4.11	+29.0	+ 7 40.9	22 53.0	- 7 28.2	-0.7190	0.5286	+0.2335	+ 2	-82		
$\alpha$ Piscium	5.3	4.14	29.0	7 37.9	20 0 51.5	- 5 26.5	-0.2074	0.5286	0.2321	+30	-51		
45 Piscium	6.9	4.17	28.7	7 8.1	3 21.3	- 3 1.3	+0.8895	0.5286	0.2302	+90	+ 9		
58 Piscium	5.0	4.35	30.0	11 25.6	13 47.0	+ 7 4.8	-1.2627	0.5292	0.2212	-39	-79		
75 Piscium	6.0	4.50	29.9	12 25.1	23 18.6	- 7 41.6	-0.2509	0.5304	0.2116	+27	-50		
$\eta$ Piscium	3.7	+4.70	+29.5	+14 49.7	21 11 22.5	+ 3 59.6	-0.3445	0.5327	+0.1971	+22	-54		
101 Piscium	6.3	4.72	29.4	14 8.9	13 27.1	+ 6 0.2	+0.7868	0.5332	0.1944	+90	+ 8		
103 Piscium	6.8	4.77	29.8	16 7.0	15 6.7	+ 7 36.6	-0.9905	0.5334	0.1922	-16	-74		
105 Piscium	6.3	4.77	29.7	15 43.8	15 18.8	+ 7 48.3	-0.7177	0.5335	0.1919	+ 1	-74		
3 Arietis	6.0	4.84	29.7	16 54.6	18 37.4	+11 0.7	-1.1730	0.5344	0.1874	-30	-73		
4 Arietis	5.7	+4.85	+29.4	+16 27.4	19 23.3	+11 45.1	-0.5449	0.5347	+0.1863	+11	-65		
$\epsilon$ Arietis	5.7	4.92	29.1	17 19.6	23 46.2	- 8 0.5	-0.6762	0.5359	0.1800	+ 4	-72		
B. A. C. 686	7.2	5.07	28.5	19 8.7	22 7 36.1	- 0 25.8	-1.2678	0.5381	0.1681	-44	-71		
$\theta$ Arietis	5.7	5.11	28.4	19 26.2	9 37.0	+ 1 31.3	-1.2449	0.5387	0.1649	-41	-71		
23 Arietis	7.5	5.11	28.1	19 14.7	10 6.1	+ 1 59.4	-0.9413	0.5388	0.1639	-14	-71		
26 Arietis	6.0	+5.20	+27.4	+19 24.6	15 30.4	+ 7 13.1	-0.2750	0.5404	+0.1551	+25	-45		
B. A. C. 782	7.0	5.19	27.0	18 26.3	16 54.8	+ 8 34.8	+0.9902	0.5409	0.1527	+90	+25		
$\mu$ Arietis	6.0	5.30	26.3	19 35.0	21 0.1	-11 28.9	+0.3640	0.5421	0.1457	+63	-10		
47 Arietis	6.0	5.44	25.0	20 16.0	23 17.9	- 4 24.6	+0.6421	0.5443	0.1324	+88	+ 7		
$\epsilon$ Arietis	4.6	5.45	25.1	20 56.4	4 49.5	- 3 54.1	-0.0175	0.5444	0.1314	+40	-28		
$\zeta$ Arietis	4.8	+5.54	+23.4	+20 40.4	12 4.6	+ 3 6.6	+1.1769	0.5465	+0.1177	+90	+45		
66 Arietis	6.0	5.67	22.3	22 27.5	18 15.9	+ 9 5.4	-0.0736	0.5481	0.1053	+36	-29		
9 Tauri	7.0	5.77	21.4	22 52.8	22 9.3	-11 9.1	-0.1373	0.5490	0.0975	+33	-31		
8 Pleiadum	6.3	5.85	20.7	23 58.4	24 1 42.4	- 7 43.0	-0.9986	0.5499	0.0902	-20	-66		
17 Tauri	4.3	5.85	20.7	23 47.9	1 44.6	- 7 40.9	-0.8033	0.5499	0.0901	- 6	-66		
19 Tauri	5.0	+5.86	+20.7	+24 9.2	1 53.3	- 7 32.5	-1.1770	0.5499	+0.0898	-37	-66		
20 Tauri	5.0	5.86	20.6	24 3.3	2 10.3	- 7 15.8	-1.0447	0.5500	0.0892	-24	-66		
21 Tauri	7.0	5.87	20.6	24 14.5	2 12.3	- 7 14.1	-1.2458	0.5500	0.0891	-47	-66		
22 Tauri	7.0	5.87	20.6	24 12.9	2 16.2	- 7 10.4	-1.2110	0.5500	0.0889	-42	-66		
23 Tauri	4.7	5.85	20.4	23 38.2	2 24.3	- 7 2.6	-0.5671	0.5500	0.0887	+ 9	-57		
$\eta$ Tauri	3.1	+5.86	+20.3	+23 47.7	2 55.9	- 6 32.0	-0.6948	0.5501	+0.0876	+ 1	-65		
B. A. C. 1170	6.3	5.84	20.1	23 6.8	3 20.1	- 6 8.7	+0.0847	0.5502	0.0867	+46	-18		
26 Tauri	7.0	5.86	20.2	23 33.0	3 36.0	- 5 53.3	-0.3690	0.5503	0.0862	+20	-43		
27 Tauri	4.0	5.87	20.2	23 44.8	3 41.7	- 5 47.8	-0.5760	0.5503	0.0860	+ 8	-57		
28 Tauri	6.2	5.87	20.1	23 49.8	3 42.3	- 5 47.2	-0.6662	0.5503	0.0860	+ 3	-63		
33 Tauri	6.3	+5.88	+19.0	+22 53.1	7 18.0	- 2 18.0	+0.6626	0.5510	+0.0784	+90	+13		
B. A. C. 1238	6.3	5.94	18.7	22 55.2	9 3.6	- 0 36.8	+0.7596	0.5513	0.0746	+90	+19		
36 Tauri	6.0	5.95	18.3	23 49.8	10 35.6	+ 0 52.0	-0.1243	0.5516	0.0714	+33	-28		
62 Tauri	6.0	6.06	15.9	24 4.1	19 28.1	+ 9 26.5	+0.1637	0.5528	0.0521	+50	-10		
95 Tauri	6.3	6.15	13.0	23 53.9	25 4 8.9	- 6 10.6	+0.7183	0.5533	0.0329	+90	+21		
99 Tauri	6.0	+6.20	+11.1	+23 47.5	10 43.6	+ 0 10.7	+1.0051	0.5534	+0.0182	+90	+40		
$\kappa$ Tauri	6.0	6.25	11.1	24 53.7	10 51.6	+ 0 18.4	-0.2072	0.5534	0.0178	+29	-27		
103 Tauri	6.0	6.24	9.6	24 8.0	15 22.1	+ 4 39.6	+0.6908	0.5532	+0.0078	+90	+22		
118 Tauri	5.7	6.35	6.6	25 4.2	26 0 55.6	-10 6.3	-0.3698	0.5523	-0.0136	+20	-37		
121 Tauri	6.0	6.31	5.6	23 58.4	3 45.2	- 7 22.5	+0.7940	0.5519	0.0198	+90	+27		
132 Tauri	5.3	+6.36	+ 3.4	+24 32.1	9 55.1	- 1 25.2	+0.0101	0.5508	-0.0334	+41	-17		
1 Geminorum	5.0	6.32	1.0	23 16.1	16 51.6	+ 5 17.4	+1.1263	0.5492	0.0484	+90	+47		
2 Geminorum	7.2	6.34	0.8	23 38.9	18 5.4	+ 6 28.7	+0.6461	0.5488	0.0510	+90	+15		
3 Geminorum	6.3	6.32	0.3	23 7.8	19 26.7	+ 7 47.3	+1.1488	0.5484	0.0539	+90	+44		
4 Geminorum	7.4	6.32	+ 0.1	23 0.9	19 48.1	+ 8 8.0	+1.2574	0.5483	0.0546	+90	+61		
5 Geminorum	6.7	+6.39	0.0	+24 26.5	20 14.9	+ 8 33.8	-0.3486	0.5482	-0.0556	+21	-39		

## ELEMENTS FOR THE PREDICTION OF OCCULTATIONS.

DECEMBER.

THE STAR'S					AT CONJUNCTION IN R. A.					Limiting Parallels	
Name.	Mag.	Red'ns from 1898.0.		Apparent Declination.	Washington Mean Time.	Hour Angle <i>H</i>	<i>Y</i>	<i>x'</i>	<i>y'</i>	N.	S.
		$\Delta\alpha$	$\Delta\delta$								
		"	"	"	d h m	h m				"	"
8 Geminorum	6.5	+6.37	- 0.7	+24 0.1	28 22 27.9	+10 42.4	+0.0104	0.5476	-0.0602	+41	-19
9 Geminorum	6.3	6.36	0.7	23 46.5	22 46.4	+11 0.2	+0.2437	0.5475	0.0609	+56	- 7
10 Geminorum	7.0	6.35	1.1	23 38.4	23 40.1	+11 52.2	+0.3372	0.5472	0.0628	+62	- 3
11 Geminorum	7.3	6.35	1.1	23 30.6	23 51.9	-11 56.4	+0.4701	0.5472	0.0632	+73	- 4
<i>d</i> Geminorum	6.0	6.27	6.0	21 52.8	27 14 57.8	+ 2 39.7	+1.0924	0.5418	0.0936	+90	+40
44 Geminorum	6.0	+6.30	- 8.0	+22 47.3	21 28.4	+ 8 57.5	-0.5658	0.5391	-0.1060	+ 9	-58
<i>d</i> Geminorum	3.5	6.25	10.2	22 10.0	28 4 35.8	- 8 8.6	-0.6780	0.5360	0.1189	+ 2	-66
56 Geminorum	5.7	6.18	10.4	20 38.0	5 30.7	- 7 15.5	+0.9169	0.5356	0.1205	+90	+24
61 Geminorum	6.0	6.16	11.1	20 57.5	7 55.7	- 4 55.1	+0.8153	0.5346	0.1247	+90	+17
63 Geminorum	5.7	6.21	11.4	21 39.0	8 17.8	- 4 33.7	-0.5561	0.5343	0.1254	+10	-59
79 Geminorum	6.3	+6.11	-13.8	+20 33.4	16 49.9	+ 3 42.3	-0.4728	0.5305	-0.1396	+14	-55
85 Geminorum	6.0	6.07	15.2	20 9.0	22 2.6	+ 8 45.3	-0.7685	0.5280	0.1478	- 2	-70
B. A. C. 2658	7.2	5.99	15.6	18 31.3	29 0 34.6	+11 12.6	+0.6629	0.5268	0.1517	+90	+ 5
$\gamma$ Cancri	4.8	5.93	17.1	17 57.0	6 21.9	- 7 10.8	+0.3951	0.5241	0.1601	+65	-11
<i>d</i> Cancri	6.0	5.92	18.7	18 39.3	12 0.5	- 1 42.3	-1.3140	0.5216	0.1679	-53	-71
B. A. C. 2810	7.0	+5.88	-18.6	+17 30.6	12 44.1	- 1 0.1	-0.1642	0.5212	-0.1689	+31	-41
<i>d</i> Cancri	6.0	5.86	18.8	17 22.6	13 17.9	- 0 27.3	-0.1119	0.5210	0.1696	+34	-38
54 Cancri	6.3	5.70	21.4	15 43.4	30 2 18.6	-11 49.7	-0.5866	0.5154	0.1856	+ 9	-69
$\alpha$ Cancri	5.7	5.69	22.1	15 42.5	5 33.1	- 8 41.0	-1.1776	0.5141	0.1892	-31	-74
$\xi$ Leonis	5.3	5.42	24.8	11 44.7	31 0 0.1	+ 9 14.3	-0.4397	0.5077	0.2068	+17	-63
$\alpha$ Leonis	3.8	+5.32	-25.5	+10 21.0	4 57.9	- 9 56.4	+0.0687	0.5063	-0.2108	+44	-34
10 Sextantis	6.0	5.23	26.4	9 24.5	13 13.8	- 1 54.4	-0.6577	0.5043	0.2166	+ 5	-79
11 Sextantis	6.0	5.22	26.4	8 47.6	14 9.0	- 1 0.8	-0.1770	0.5041	0.2172	+31	-48
$\pi$ Leonis	5.0	+5.20	-26.5	+ 8 31.6	15 17.3	+ 0 5.6	-0.1294	0.5039	-0.2179	+34	-46

OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1898.												
Date.	THE STAR'S		IMMERISION.				EMERISION.				Duration of Oc- cultation.	
			Washington.		Angle from		Washington.		Angle from			
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.		
			h m	h m	°	°	h m	h m	°	°	h m	
Jan. 5	125 Tauri	6.0	0 45	5 42	79	137	1 56	6 53	265	325	1 11	
25	16 Piscium	5.8	3 56	7 35	70	119	4 58	8 36	234	183	1 1	
30	17 Tauri	4.3	7 33	10 52	101	42	8 43	12 1	253	197	1 9	
30	8 Pleiadum	6.3	7 35	10 54	59	0	8 39	11 57	295	238	1 3	
30	20 Tauri	5.0	8 17	11 35	41	343	9 3	12 21	315	259	0 46	
30	23 Tauri	4.7	8 43	12 2	160	104	9 4	12 22	195	140	0 20	
30	7 Tauri	3.1	8 59	12 17	108	52	9 58	13 16	148	194	0 59	
30	28 Tauri	6.2	9 48	13 6	103	49	10 44	14 2	254	198	0 56	
30	27 Tauri	4.0	9 51	13 9	124	70	10 38	13 56	233	176	0 47	
Feb. 5	0 <sup>2</sup> Cancrī	4.0	7 48	10 43	116	144	9 14	12 9	307	296	1 26	
5	0 <sup>1</sup> Cancrī	5.7	8 26	11 21	189	201	8 58	11 53	232	229	0 32	
6	10 Sextantis	6.0	15 17	18 7	107	55	14 13	19 2	307	255	0 55	
7	34 Sextantis	6.7	14 45	17 30	94	46	15 41	18 27	326	275	0 57	
13	A <sup>2</sup> Scorpii	5.2	11 21	13 44	104	150	12 26	14 48	296	333	1 4	
13	3 Scorpii	6.7	11 53	14 15	67	109	12 42	15 4	333	9	0 49	
25	26 Arietis	6.0	6 8	7 44	84	28	7 20	8 56	250	194	1 12	
Mar. 3	85 Geminorum	6.0	13 55	15 6	158	105	14 33	15 44	246	195	0 38	
4	0 Cancrī	5.7	4 13	5 22	61	116	5 6	6 15	334	28	0 53	
10	75 Virginis †	6.0	7 38	8 23	90	142	8 28	9 13	326	14	0 50	
25	ε Arietis	4.6	6 20	6 6	161	105	6 31	6 17	177	121	0 11	
26	27 Tauri	4.0	4 25	4 8	82	54	5 56	5 38	257	203	1 30	
26	26 Tauri	7.0	4 26	4 9	130	102	5 24	5 6	208	159	0 57	
26	28 Tauri	6.2	4 30	4 13	63	33	5 58	5 40	276	222	1 27	
April 2	10 Sextantis	6.0	11 31	10 45	131	98	12 47	12 1	300	254	1 16	
3	34 Sextantis	6.7	10 19	9 30	155	162	11 32	10 42	280	262	1 12	
9	α Scorpii	1.2	18 26	17 11	135	110	19 20	18 5	227	193	0 54	
11	λ Sagittarii †	2.9	13 6	11 44	62	112	14 0	12 38	300	345	0 54	
13	0 Capricorni †	6.2	15 4	13 34	18	69	15 37	14 7	315	2	0 33	
22	9 Tauri	7.0	9 25	7 22	85	31	10 24	8 20	270	213	0 58	
24	118 Tauri †	5.7	12 45	10 32	76	18	13 32	11 19	299	241	0 47	
26	44 Geminorum	6.0	9 11	6 51	161	109	10 5	7 44	242	186	0 53	
27	85 Geminorum	6.0	8 56	6 32	129	94	10 19	7 55	287	235	1 23	
28	54 Cancrī	6.3	13 31	11 2	81	27	14 20	11 51	332	279	0 49	
29	ξ Leonis	5.3	9 38	7 7	185	180	10 23	7 51	246	223	0 44	
May 6	3 Scorpii	6.7	15 6	12 6	118	127	16 23	13 22	270	262	1 16	
10	σ Capricorni	5.6	19 37	16 29	6	12	20 29	17 12	303	300	0 43	
24	79 Geminorum	6.3	13 36	9 25	52	359	14 5	9 54	350	296	0 29	
June 3	σ Scorpii	3.4	12 16	7 26	74	116	13 11	8 21	317	352	0 55	
5	B. A. C. 6369	6.2	16 20	11 22	125	152	17 16	12 18	220	237	0 56	
8	λ Capricorni	5.7	18 23	13 12	125	165	18 55	13 44	179	214	0 32	
14	μ Arietis	6.0	20 50	15 15	73	126	21 51	16 16	283	294	1 1	
16	62 Tauri †	6.0	20 41	14 59	108	166	21 26	15 44	226	283	0 45	
30	A <sup>2</sup> Scorpii	5.2	15 31	8 55	131	134	16 42	10 5	255	243	1 10	
30	3 Scorpii	6.7	15 58	9 21	101	99	17 17	10 41	280	262	1 20	
July 4	σ Capricorni	5.6	16 37	9 44	42	82	17 37	10 44	284	315	1 0	
4	π Capricorni	5.1	21 22	14 29	23	9	22 20	15 26	280	255	0 57	
4	B. A. C. 7044	7.0	22 55	16 2	334	302	22 59	16 5	328	296	0 3	
6	θ Aquarii	4.4	18 59	11 59	90	129	20 2	13 1	208	238	1 2	
10	101 Piscium	6.3	20 10	12 54	100	153	21 0	13 43	203	256	0 49	
20	0 Leonis *	3.8	16 24	8 29	89	37	17 11	9 16	318	266	0 47	
30	B. A. C. 6369	6.2	17 28	8 53	129	144	18 18	9 43	208	212	0 50	

NOTE.—The angles of position are counted from the north point and vertex of the moon's limb, toward the east.

\* Whole occultation below the horizon of Washington.

† Immersion below the horizon of Washington.

‡ Emergence below the horizon of Washington.

NOTE.—The angles of position are counted from the north point and vertex of the moon's limb, toward the east.

\* Whole occultation below the horizon of Washington. † Immersion below the horizon of Washington.

‡ Emerision below the horizon of Washington.



## OCCULTATIONS VISIBLE AT WASHINGTON DURING THE YEAR 1898.

Date.	THE STAR'S		IMMERSION				EMERSION.				Duration of Oc- cultation.
			Washington.		Angle from		Washington.		Angle from		
	Name.	Mag.	Sidereal Time.	Mean Time.	North Point.	Vertex.	Sidereal Time.	Mean Time.	North Point.	Vertex.	
			h m	h m	°	°	h m	h m	°	°	h m
Aug. 2	λ Capricorni	5.7	17 23	8 36	128	174	17 54	9 7	183	226	0 31
2	B. A. C. 7620	6.5	21 37	12 50	105	108	22 25	13 38	184	175	0 48
4	16 Piscium	5.8	20 42	11 47	9	49	21 31	12 35	283	315	0 48
5	45 Piscium	6.9	19 58	10 59	33	83	20 57	11 58	264	311	0 59
8	ε Arietis	4.6	21 56	12 45	5	61	22 26	13 15	308	5	0 30
9	B. A. C. 1170	6.3	20 27	11 12	55	112	21 17	12 3	273	328	0 51
13	63 Geminorum	5.7	2 8	16 37	110	165	3 16	17 45	264	320	1 8
25	α Ophiuchi	4.9	18 38	8 21	134	115	19 29	9 12	216	187	0 51
25	B. A. C. 5813	6.8	18 55	8 45	123	100	19 53	9 43	224	191	0 58
28	σ Capricorni	5.6	16 21	5 52	56	98	17 27	6 58	271	305	1 6
28	π Capricorni	5.1	21 14	10 44	29	17	22 17	11 47	273	248	1 3
28	B. A. C. 7044	7.0	22 35	12 6	359	331	23 9	12 39	303	269	0 33
30	θ Aquarii	4.4	19 1	8 24	77	116	20 10	9 32	221	250	1 8
Sept. 4	μ Arietis	6.0	0 12	13 14	86	137	1 27	14 29	220	256	1 15
5	9 Tauri	7.0	1 35	14 34	45	94	2 54	15 52	275	299	1 18
6	62 Tauri	6.0	22 6	11 1	78	132	23 5	12 0	253	309	0 59
8	5 Geminorum	6.7	23 24	12 11	42	98	0 6	12 53	311	5	0 42
9	44 Geminorum	6.0	0 44	13 26	32	86	1 14	13 57	333	27	0 31
20	B. A. C. 5253	5.8	18 36	6 37	22	350	18 57	6 58	346	310	0 21
25	B. A. C. 7263	5.9	18 6	5 47	122	156	18 48	6 29	189	215	0 42
26	B. A. C. 7620	5.9	18 55	6 32	89	126	20 1	7 38	211	236	1 6
27	B. A. C. 7951 (mean)	6.7	20 15	7 48	113	147	20 56	8 29	179	206	0 41
28	15 Piscium	6.6	18 19	5 48	109	160	19 0	6 29	194	243	0 41
28	19 Piscium	4.9	1 55	13 23	42	6	3 5	14 33	253	208	1 10
Oct. 3	33 Tauri †	6.3	20 18	7 27	83	140	21 9	8 18	247	303	0 51
3	B. A. C. 1238	6.3	22 10	9 19	149	203	22 25	9 34	177	233	0 15
8	B. A. C. 2810	7.0	1 26	12 15	103	157	2 26	13 14	279	332	0 59
8	δ <sup>2</sup> Cancri	6.0	2 2	12 51	122	175	3 1	13 49	261	315	0 58
10	π Leonis †	5.0	2 59	13 40	134	186	3 52	14 32	265	317	0 52
17	42 Libræ *	5.7	21 25	7 39	71	18	22 15	8 29	294	243	0 50
24	κ Aquarii	5.2	2 38	12 23	17	331	3 25	13 10	282	233	0 47
25	κ Piscium	4.7	1 46	11 27	57	20	2 58	12 39	239	193	1 12
25	9 Piscium	6.6	1 52	11 34	93	56	2 50	12 32	203	156	0 58
29	47 Arietis	6.0	6 41	16 7	152	96	7 4	16 29	189	133	0 22
30	B. A. C. 1170	6.3	4 19	13 40	37	13	5 25	14 47	301	253	1 7
Nov. 30	33 Tauri	6.3	9 21	18 42	135	80	10 3	19 24	224	170	0 42
2	10 Geminorum †	7.0	22 34	7 44	64	122	23 22	8 33	293	349	0 49
2	11 Geminorum †	7.3	22 41	7 52	96	151	23 35	8 45	261	317	0 53
6	0 Leonis	3.8	3 26	12 20	121	173	4 27	13 21	278	330	1 1
17	50 Sagittarii	5.9	20 39	4 51	46	29	21 48	6 0	269	238	1 9
24	101 Piscium	6.3	22 35	6 19	73	123	23 49	7 33	224	262	1 14
25	μ Arietis	6.0	8 29	16 8	58	5	9 22	17 1	286	231	0 53
27	62 Tauri	6.0	5 41	13 12	60	15	6 58	14 29	296	240	1 17
28	103 Tauri	6.0	23 34	7 2	119	174	0 24	7 52	221	277	0 50
29	9 Geminorum	6.3	9 24	16 47	57	359	10 9	17 33	236	278	0 46
29	10 Geminorum	7.0	10 31	17 54	57	359	11 14	18 36	335	278	0 42
29	11 Geminorum	7.3	10 40	18 2	85	27	11 39	19 2	307	251	1 0
Dec. 1	B. A. C. 2658	7.2	11 25	18 40	122	68	12 34	19 49	290	245	1 9
24	33 Tauri	6.3	23 50	5 36	113	170	0 45	6 31	210	267	0 55
25	103 Tauri	6.0	10 42	16 23	125	70	11 34	17 15	250	195	0 52
26	2 Geminorum †	7.2	13 22	18 57	73	16	14 6	19 42	309	251	0 45

NOTE.—The angles of position are counted from the north point and vertex of the moon's limb, toward the east.

\* Whole occultation below the horizon of Washington. † Immersion below the horizon of Washington.

‡ Emergence below the horizon of Washington.

FOR COMPUTING THE TIME AND HOUR-ANGLE OF APPARENT CONJUNCTION.

h		Lat. 72°			Lat. 66°			Lat. 60°			Lat. 54°			Lat. 48°			Lat. 42°			Lat. 36°		
		x'			x'			x'			x'			x'			x'			x'		
		.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50	.62	.56	.50
h	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m	m
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	2	2	2	2	2	2	3	3	3	3	4	4	4	4	4	5	5	5	6	5	6	7
20	3	3	4	4	5	5	5	6	7	6	7	9	8	9	11	9	10	12	11	12	14	22
30	5	5	6	6	7	8	8	9	11	10	11	13	12	13	16	14	16	18	16	18	22	22
40	6	7	8	8	9	11	11	12	14	13	15	17	16	18	21	18	21	24	21	24	29	29
50	7	8	10	10	11	13	13	15	17	16	19	21	19	22	26	22	26	30	26	30	36	36
1	0	9	10	11	12	14	16	16	18	21	19	22	26	23	26	31	26	31	36	30	35	42
10	10	10	12	13	14	16	18	18	21	24	22	26	30	26	30	36	31	35	42	35	40	48
20	12	13	15	16	18	21	21	23	27	25	29	34	30	34	40	35	40	47	39	45	54	54
30	13	15	17	18	20	23	23	26	30	28	32	37	33	38	45	39	44	52	43	50	59	59
40	14	16	18	20	22	25	25	29	33	31	35	41	36	42	49	42	48	57	47	54	64	64
50	16	18	20	21	24	28	27	31	36	34	38	44	39	45	53	45	52	61	51	58	68	68
2	0	17	19	22	23	26	30	29	33	39	36	41	47	42	48	56	48	55	65	54	62	72
10	18	20	23	25	28	32	31	36	41	38	43	50	45	51	59	51	59	68	57	66	76	76
20	19	22	24	26	30	34	33	38	43	40	46	53	47	54	62	54	62	71	60	69	80	80
30	20	23	26	28	31	36	35	40	45	42	48	55	50	56	65	57	64	74	63	72	83	83
40	21	24	27	29	33	37	37	42	47	44	50	58	52	59	68	59	67	77	65	74	86	86
50	22	25	28	30	34	39	38	43	49	46	52	60	54	61	70	61	69	79	68	76	88	88
3	0	23	26	30	31	35	40	40	45	51	48	54	62	56	63	72	63	71	81	70	79	90
10	24	27	31	33	36	42	41	46	53	49	56	63	57	65	74	65	73	83	72	81	92	92
20	25	28	32	34	38	43	42	47	54	51	57	65	59	66	75	66	74	85	73	82	93	93
30	26	29	33	35	39	44	43	49	55	52	58	66	60	67	77	68	76	86	74	83	95	95
40	26	29	33	36	40	45	44	50	56	53	59	67	61	69	78	69	77	87	75	84	96	96
50	27	30	34	36	41	46	45	51	57	54	60	68	62	70	79	70	78	88	76	85	96	96
4	0	28	31	35	37	41	47	46	52	58	55	61	69	63	70	79	71	79	89	77	86	97
10	28	31	35	38	42	47	47	52	59	56	62	70	64	71	80	71	79	89	78	86	97	97
20	29	32	36	38	42	48	47	53	59	56	62	70	64	71	80	72	80	89	78	87	97	97
30	29	32	36	39	43	48	48	53	60	57	63	71	65	72	81	72	80	90	79	87	97	97
40	29	33	37	39	43	49	48	53	60	57	63	71	65	72	81	72	80	89	79	87	97	97
50	30	33	37	39	44	49	48	54	60	57	63	71	65	72	81	72	80	89	79	87	96	96
5	0	30	33	37	39	44	49	54	60	57	63	71	65	72	80	72	80	89	78	86	95	95
10	30	33	37	40	44	49	49	54	60	57	63	71	65	72	80	72	79	88	78	86	95	95
20	30	33	37	40	44	49	49	54	60	57	63	71	65	71	79	72	79	88	78	85	94	94
30	30	33	37	40	44	49	49	54	60	57	63	70	64	71	79	71	78	87	77	85	93	93
40	30	33	37	39	44	49	48	53	59	56	62	70	64	70	78	70	77	86	76	84	91	91
50	30	33	37	39	43	48	48	53	59	56	61	69	63	70	77	70	77	85	75	83	90	90
6	0	30	33	37	39	43	48	48	52	58	55	61	68	63	69	76	69	76	84	74	82	89
10	30	33	37	39	43	47	47	52	58	55	60	67	62	68	75	68	75	82	73	80	87	87
20	29	32	36	38	42	47	47	51	57	54	60	66	61	67	74	67	73	81	72	79	85	85
30	29	32	36	38	42	46	46	51	56	53	59	65	60	66	73	66	72	80	71	78	84	84
40	29	32	35	37	41	46	45	50	55	53	58	64	59	65	71	65	71	78	70	76	82	82
50	28	31	35	37	40	45	45	49	54	52	57	62	58	63	70	63	69	76	68	74	80	80
7	0	28	31	34	36	40	44	44	48	53	51	55	61	57	62	68	62	68	75	67	73	78
10	27	30	34	35	39	43	43	47	52	50	54	60	56	61	67	61	66	73	65	71	76	76
20	27	30	33	35	38	42	42	46	51	48	53	58	54	59	65	59	65	71	64	68	74	74
30	26	29	32	34	37	41	41	45	49	47	52	57	53	58	63	58	63	69	62	67	71	71
40	26	28	31	33	36	40	40	44	48	46	50	55	51	56	62	56	61	67	61	66	70	70
50	25	27	31	32	35	39	39	42	47	45	49	53	50	54	60	54	59	65	59	64	68	68
8	0	24	27	30	31	34	38	38	41	45	43	47	52	48	52	58	53	57	63	57	63	69
10	24	26	29	30	33	37	36	40	44	42	46	50	47	51	56	52	55	60	54	59	64	69
20	23	25	28	29	32	35	35	38	42	40	44	48	45	49	54	49	52	57	51	56	61	66
30	22	24	27	28	31	34	34	37	41	39	42	46	43	47	52	47	50	55	49	53	58	63
40	21	23	26	27	30	33	33	35	39	37	41	44	41	45	49	44	47	51	45	49	53	57
50	20	22	25	26	28	31	31	34	37	36	39	42	40	43	47	40	43	47	41	44	48	52
9	0	19	21	24	25	27	30	32	35	34	37	40	37	40	43	47	40	43	47	41	44	48
10	18	20	22	24	26	28	28	31	34	32	35	38	35	38	41	45	38	41	45	38	41	44
20	18	19	21	22	24	27	27	29	32	31	33	36	33	36	39	36	39	42	36	39	42	45
30	16	18	20	21	23	25	25	27	30	29	31	33	30	32	34	31	33	36	33	35	37	40
40	15	17	19	20	22	24	24	26	28	27	29	31	27	29	31	33	35	37	34	36	38	40

(Concluded at bottom of next page.)



## DISK OF MERCURY, 1898.

## FOR WASHINGTON MEAN NOON.

Date.	$k$	$i$	$\theta$	$L$	Date.	$k$	$i$	$\theta$	$L$
Jan. 1	0.101	143.0	343.4	22.9	July 5	0.963	22.2	353.5	56.8
6	0.006	171.9	262.5	1.5	10	0.905	35.9	3.7	48.1
11	0.098	143.5	192.4	20.3	15	0.834	48.1	9.3	41.2
16	0.224	116.9	185.6	39.9	20	0.764	58.2	14.5	36.5
21	0.439	97.0	181.7	43.8	25	0.696	66.9	18.3	33.6
26	0.566	82.4	178.0	40.3	30	0.631	74.8	21.2	32.8
31	0.661	71.2	174.1	35.7	Aug. 4	0.563	82.8	23.7	31.6
Feb. 5	0.733	62.3	170.1	32.0	9	0.489	91.3	26.0	31.6
10	0.790	54.6	166.1	29.4	14	0.406	100.9	28.3	31.5
15	0.833	48.2	162.0	28.0	19	0.309	112.4	31.0	30.0
20	0.872	41.8	157.7	27.7	24	0.200	126.8	32.9	24.8
25	0.907	35.4	153.3	28.5	29	0.095	144.2	41.8	18.7
Mar. 2	0.939	28.5	148.9	30.7	Sept. 3	0.017	165.2	68.6	4.0
7	0.969	20.4	143.9	34.2	8	0.025	161.7	174.8	5.0
12	0.990	11.3	130.5	40.6	13	0.138	136.3	196.2	25.4
17	0.997	6.1	34.0	49.2	18	0.365	105.7	202.5	54.6
22	0.972	19.2	347.1	59.9	23	0.581	80.7	206.5	67.7
27	0.891	38.6	336.2	68.9	28	0.775	56.6	209.7	65.9
Apr. 1	0.745	60.6	334.2	70.3	Oct. 3	0.896	37.7	212.5	55.4
6	0.560	83.1	333.9	61.9	8	0.961	22.8	215.3	44.8
11	0.377	104.3	333.8	47.7	13	0.991	11.1	220.1	36.6
16	0.220	124.0	333.4	31.6	18	0.999	2.7	256.3	31.0
21	0.107	141.9	331.9	17.2	23	0.997	6.0	16.8	26.9
26	0.026	161.3	328.7	4.6	28	0.988	12.7	20.4	25.6
May 1	0.000	179.8	213.3	0.0	Nov. 2	0.973	18.8	21.2	24.8
6	0.026	161.5	154.7	4.3	7	0.954	24.9	20.0	25.2
11	0.088	145.6	153.6	12.9	12	0.927	31.3	18.0	26.7
16	0.170	131.3	152.5	21.2	17	0.891	38.5	15.3	29.5
21	0.258	118.9	153.1	27.3	22	0.841	47.0	12.1	33.9
26	0.348	107.6	154.2	31.8	27	0.763	58.3	8.6	40.1
31	0.443	96.6	156.1	36.0	Dec. 2	0.658	71.5	5.1	48.3
5	0.543	85.1	158.6	40.6	7	0.448	90.2	1.8	49.0
10	0.655	72.0	162.1	47.0	12	0.285	115.5	359.3	47.4
15	0.773	57.0	166.8	54.8	17	0.075	148.2	352.6	22.0
20	0.894	38.0	173.2	63.3	22	0.007	170.3	282.8	1.8
25	0.973	19.1	185.7	67.4	27	0.133	137.3	196.4	27.0
30	0.999	4.3	295.0	64.9	32	0.331	109.8	191.8	46.0

## NOTATION.

$k$ , the ratio of the illuminated portion of the apparent disk to the entire apparent disk considered as the superficies of a circle.

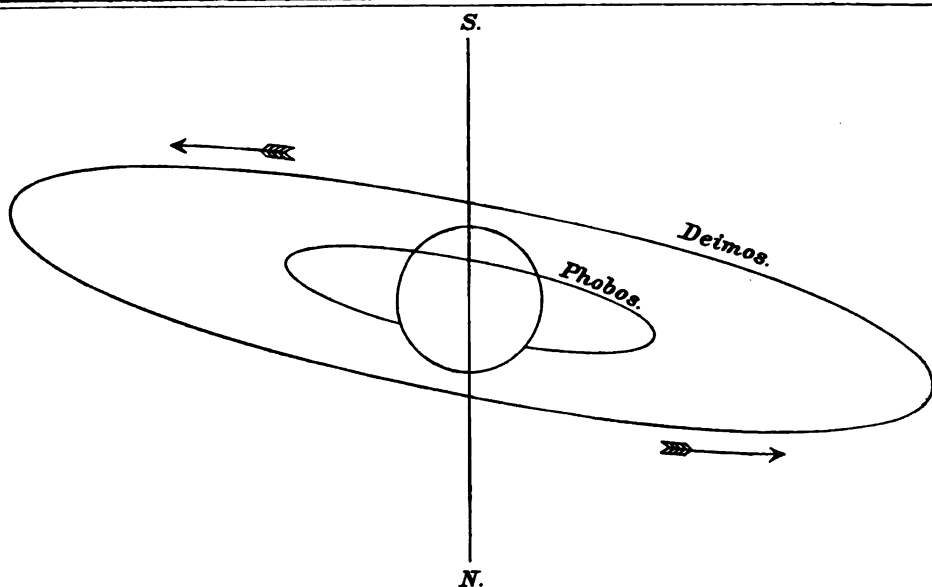
$i$ , the angle between the sun and earth, as seen from the planet.

$\theta$ , the angle which the line joining the cusps, or extremities of the illuminated portion, makes with the meridian.

$L$ , the brilliancy of the disk. The unit of  $L$  is the amount of light received by an eye from a circular disk with the same albedo as the planet, subtending an angular radius of one second of arc, situated at distance unity from the sun, and illuminated by the latter as the mean disk of the planet is illuminated.

## FOR WASHINGTON MEAN NOON.

Date.	<i>k</i>	<i>i</i>	$\theta$	<i>L</i>	Date.	<i>k</i>	<i>i</i>	$\theta$	<i>L</i>
Jan. 1	0.983	14.9	179.8	49.0	Aug. 4	0.696	66.9	22.6	88.1
6	0.987	13.2	175.9	48.5	9	0.678	69.2	23.1	92.1
11	0.990	11.5	171.8	48.1	14	0.659	71.5	23.4	96.4
16	0.993	9.9	167.2	47.8	19	0.639	73.8	23.5	101.3
21	0.995	8.3	162.2	47.5	24	0.619	76.2	23.5	106.5
26	0.997	6.8	156.3	47.3	29	0.598	78.7	23.3	112.4
31	0.998	5.2	148.8	47.1	Sept. 3	0.577	81.2	22.9	118.9
Feb. 5	0.999	3.7	137.1	46.9	8	0.554	83.8	22.3	125.9
10	1.000	2.4	114.9	46.8	13	0.531	86.4	21.7	133.7
15	1.000	1.8	71.1	46.8	18	0.507	89.2	20.9	142.1
20	1.000	2.4	28.1	46.8	23	0.481	92.2	20.0	151.2
25	0.999	3.9	8.7	46.9	28	0.454	95.3	19.0	161.2
Mar. 2	0.998	5.3	358.5	47.0	Oct. 3	0.425	98.7	17.9	171.6
7	0.996	6.8	352.7	47.1	8	0.394	102.3	16.9	182.2
12	0.994	8.5	348.9	47.3	13	0.361	106.2	15.9	192.4
17	0.992	10.2	346.3	47.6	18	0.325	110.5	14.9	201.8
22	0.989	11.9	344.6	47.9	23	0.287	115.2	14.2	208.4
27	0.986	13.7	343.3	48.2	28	0.245	120.6	13.8	210.1
Apr. 1	0.982	15.5	342.8	48.6	Nov. 2	0.202	126.6	13.6	204.2
6	0.977	17.3	342.5	49.1	4	0.184	129.3	13.7	198.6
11	0.972	19.1	342.8	49.6	6	0.165	132.0	13.9	191.2
16	0.967	21.0	343.3	50.2	8	0.147	135.0	14.1	181.3
21	0.961	22.9	344.2	50.8	10	0.128	138.1	14.4	169.0
26	0.954	24.8	345.4	51.5	12	0.110	141.3	14.8	154.2
May 1	0.946	26.8	346.9	52.2	14	0.092	144.8	15.4	136.7
6	0.938	28.7	348.6	53.1	16	0.074	148.4	16.0	117.5
11	0.930	30.7	350.6	54.0	18	0.058	152.1	16.8	96.9
16	0.921	32.7	352.8	55.0	20	0.043	156.0	17.8	76.0
21	0.911	34.7	355.1	56.1	22	0.030	160.0	19.0	55.0
26	0.900	36.8	357.5	57.2	24	0.019	164.3	20.6	35.3
31	0.890	38.9	0.0	58.4	26	0.010	168.6	23.0	19.8
June 5	0.878	41.0	2.5	59.8	28	0.004	172.9	27.7	7.5
10	0.865	43.1	5.0	61.2	30	0.001	177.2	46.1	1.2
15	0.853	45.2	7.4	62.7	Dec. 2	0.000	177.8	163.7	0.6
20	0.839	47.3	9.7	64.4	4	0.004	173.3	186.8	7.7
25	0.825	49.4	11.8	66.3	6	0.010	169.0	191.7	19.0
30	0.811	51.6	13.8	68.3	8	0.018	164.7	194.2	33.9
July 5	0.796	53.7	15.7	70.4	10	0.029	160.5	195.5	53.0
10	0.780	55.9	17.3	72.7	12	0.042	156.3	196.4	74.5
15	0.764	58.1	18.7	75.2	14	0.057	152.4	197.0	96.7
20	0.747	60.3	20.0	78.0	16	0.073	148.6	197.4	118.4
25	0.731	62.5	21.1	81.1	18	0.091	144.9	197.6	138.6
30	0.714	64.7	21.9	84.4	23	0.137	136.6	197.6	179.4
35	0.696	66.9	22.6	88.1	28	0.184	129.2	197.1	205.1
					33	0.230	122.8	196.1	216.8



*APPARENT ORBITS OF THE SATELLITES OF MARS DURING THE OPPOSITION OF 1899,  
AS SEEN IN AN INVERTING TELESCOPE.*

The circle represents the disk of the planet and is on the same scale as the orbits.

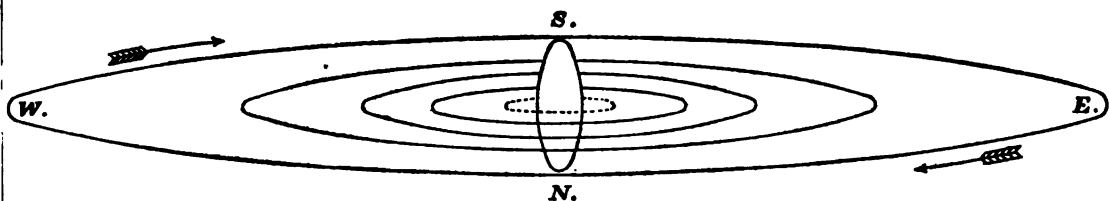
WASHINGTON MEAN TIME OF GREATEST ELONGATION, 1898.

Phobos.				Deimos.			
	d	h			d	h	
Nov.	12	19.6 W.	Nov.	29	13.5 E.	Dec.	16
	13	22.4 E.		30	16.3 W.		17
	15	1.2 W.	Dec.	1	19.1 E.		18
	16	4.0 E.		2	21.9 W.		19
	17	6.8 W.		4	0.7 E.		20
	18	9.6 E.		5	3.5 W.		21
	19	12.4 W.		6	6.3 E.		23
	20	15.2 E.		7	9.0 W.		24
	21	18.0 W.		8	11.8 E.		25
	22	20.8 E.		9	14.6 W.		26
	23	23.6 W.		10	17.4 E.		27
	25	2.4 E.		11	20.2 W.		28
	26	5.2 W.		12	23.0 E.		29
	27	7.9 E.		14	1.8 W.		30
	28	10.7 W.		15	4.6 E.		31
						Dec.	7
							9
							11
							13
							15
							17
							19
							22
							22
							20
							24
							26
							15
							3
							25
							26
							28
							30
							32

For Phobos every seventh eastern and western elongation is given and for Deimos every third; the intermediate ones may be found by adding the periodic time of each satellite. Periodic time of Phobos,  $7^h 39^m 13^s.85$ . Periodic time of Deimos,  $30^h 17^m 54^s.86$ .

*APPARENT DISK OF MARS.*

<b>Jan.</b>	<b>1,</b>	<b>0.995</b>	<b>April</b>	<b>1,</b>	<b>0.960</b>	<b>June</b>	<b>30,</b>	<b>0.912</b>	<b>Sept.</b>	<b>28,</b>	<b>0.878</b>
	<b>31,</b>	<b>0.986</b>	<b>May</b>	<b>1,</b>	<b>0.944</b>	<b>July</b>	<b>30,</b>	<b>0.896</b>	<b>Oct.</b>	<b>28,</b>	<b>0.888</b>
<b>March</b>	<b>2,</b>	<b>0.974</b>		<b>31,</b>	<b>0.928</b>	<b>Aug.</b>	<b>29,</b>	<b>0.883</b>	<b>Nov.</b>	<b>27,</b>	<b>0.917</b>
									<b>Dec.</b>	<b>27,</b>	<b>0.979</b>



APPARENT ORBITS OF THE SATELLITES OF JUPITER IN 1898,  
AS SEEN IN AN INVERTING TELESCOPE.

(The vertical scale is three times the horizontal one.)

The object of this figure is to facilitate the identification of the satellites in cases where the diagrams of configurations do not suffice for that purpose. If two satellites are seen together reference to the above diagram may enable one to identify the inner and outer satellite of the pair. The central, vertical ellipse represents the disk of Jupiter, elongated three times in the vertical direction. The dotted line represents the orbit of Satellite V.

Facing each page of the phenomena of Jupiter's satellites, pages 462—482, is the page of diagrams of configurations, for the same month. The light disks ○ in the vertical row in the middle of the page represent the relative position of Jupiter each day. The dots adjacent in the same horizontal space represent the positions of the several satellites on the same day, at the hour and minute of Washington mean time indicated above the diagrams. The latitudes of the satellites are always considered zero in constructing the diagrams, except where two or more satellites chance to be at nearly the same distance from the planet, when they are placed one above the other according to their apparent latitudes. The numerals designating the satellites are placed on the right or left hand side of the dot, according as the motion of the satellite, at the time of the configuration, is toward the east or toward the west—the motion being always toward the numeral. Sometimes, at the epoch of the configuration, one or more satellites will be projected on the disk of the planet: this phenomenon is indicated by a light disk ○ at the left hand side of the page. Frequently, also, one or more satellites will be invisible, being concealed in occultation behind the disk, or eclipsed in the shadow of the planet: this phenomenon is indicated by a dark disk ● at the right hand side of the page. In both cases, the annexed numeral serves to point out which satellite is thus rendered invisible.

When an observation is made at a different hour from that for which the diagram is constructed, the motion of the satellite during the interval may be judged by transferring its given position to the above diagram, and estimating its motion during the elapsed interval by means of the following table of the periods;—

MEAN SYNODIC PERIODS OF THE SATELLITES.

	d	h	m	s	=	d		d	h	m	s	=	d
I.	1	18	28	35.945	=	1.76986048	III.	7	3	59	35.854	=	7.16638720
II.	3	13	17	53.735	=	3.55409416	IV.	16	18	5	6.928	=	16.75355241
V.	0	11	57	27.635	=	0.49823652							

## SATELLITE V.

WASHINGTON MEAN TIME OF EVERY TWENTIETH GREATEST ELONGATION.

Jan.	d	h	E.	March	d	h	E.	Jan.	d	h	W.	March	d	h	W.
	0	19.3	E.		31	11.2	E.		0	13.3	W.		31	17.2	W.
	10	18.4	E.		10	10.3	E.		10	12.5	W.		10	16.2	W.
Feb.	20	17.5	E.	April	20	9.4	E.	Feb.	20	11.6	W.	April	20	15.3	W.
	30	16.7	E.		30	8.5	E.		30	10.7	W.		30	14.4	W.
	9	15.8	E.		10	7.6	E.		9	9.8	W.		10	13.6	W.
March	19	14.8	E.	May	20	6.7	E.	March	19	8.9	W.	May	20	12.7	W.
	1	13.9	E.		30	17.8	E.		1	8.0	W.		30	11.8	W.
	11	13.0	E.	June	9	17.0	E.		11	7.0	W.	June	9	11.0	W.
	21	12.1	E.		19	16.1	E.		21	18.1	W.		19	10.2	W.

WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

## SATELLITE I.

Jan.		h	m	March	19	h	m	June	5	h	m	Aug.	22	h	m
	1	3	56.1		21	17	59.9		7	13	38.0		24	11	9.0
	2	22	24.3		23	12	25.8		9	8	6.2		26	5	39.0
	4	16	52.4		25	6	51.7		11	2	34.5		28	0	9.3
	6	11	20.3		27	1	17.5		12	21	2.8		29	18	39.5
	8	5	48.3		28	19	43.3	July	14	15	31.1	Sept.	31	13	9.7
	10	0	16.0	April	30	14	9.2		16	9	59.6		2	7	39.9
	11	18	43.8		1	8	35.0		18	4	28.3		4	2	10.3
	13	13	11.5		3	3	1.0		19	22	56.8		5	20	40.5
	15	7	39.1		4	21	26.9		21	17	25.6		7	15	10.8
	17	2	6.6		6	15	53.0	Aug.	23	11	54.3		9	9	41.0
	18	20	34.2		8	10	19.0		25	6	23.1	Nov.	11	4	11.4
	20	15	1.6		10	4	45.1		27	0	51.9		12	22	41.6
	22	9	28.9		11	23	11.2	July	28	19	20.9		13	22	22.6
	24	3	56.2		13	17	37.3		30	13	49.8		15	16	52.5
	25	22	23.5		15	12	3.5		2	8	18.9		17	11	22.7
	27	16	50.6		17	6	29.7		4	2	47.9	Dec.	19	5	52.8
	29	11	17.8		19	0	56.0		5	21	17.0		21	0	22.9
	31	5	44.8	May	20	19	22.1	Aug.	7	15	46.1		22	18	52.9
Feb.	2	0	11.7		22	13	48.5		9	10	15.4		24	13	22.9
	3	18	38.7		24	8	15.0		11	4	44.7		26	7	52.8
	5	13	5.5		26	2	41.6		12	23	13.9		28	2	22.8
	7	7	32.2		27	21	8.1		14	17	43.2		29	20	52.7
	9	1	59.0		29	15	34.8		16	12	12.7		1	15	22.7
	10	20	25.7		1	10	1.5		18	6	42.1		3	9	52.4
	12	14	52.2		3	4	28.2		20	1	11.7		5	4	22.2
	14	9	18.7		4	22	55.1		21	19	41.2		6	22	52.0
	16	3	45.2		6	17	22.0		23	14	10.7		8	17	21.9
	17	22	11.5		8	11	48.9		25	8	40.3		10	11	51.5
	19	16	37.9		10	6	15.9		27	3	10.1		12	6	21.3
	21	11	4.2		12	0	42.9		28	21	39.8		14	0	50.9
	23	5	30.4		13	19	10.1		30	16	9.6		15	19	20.5
	24	23	56.6		15	13	37.4		1	10	39.4		17	13	50.0
	26	18	22.7		17	8	4.7		3	5	9.2		19	8	19.6
	28	12	48.8		19	2	32.1		4	23	38.9		21	2	49.0
March	2	7	14.9		20	20	59.6		6	18	8.8		22	21	18.5
	4	1	41.0		22	15	27.0		8	12	38.6		24	15	47.8
	5	20	6.9		24	9	54.6		10	7	8.5		26	10	17.2
	7	14	32.9		26	4	22.3		12	1	38.5		28	4	46.4
	9	8	58.8		27	22	50.0		13	20	8.6		29	23	15.7
	11	3	24.8		29	17	17.9		15	14	38.4		31	17	44.9
	12	21	50.7		31	11	45.8		17	9	8.5				
	14	16	16.6		2	6	13.6		19	3	38.5				
	16	10	42.5		4	0	41.6		20	22	8.7				
	18	5	8.4												



## WASHINGTON MEAN TIME OF SUPERIOR GEOCENTRIC CONJUNCTION.

## SATELLITE II.

Jan.	2	h m	March	21	h m	June	7	h m	Aug.	25	h m
	6	16 53.6		25	8 16.7		11	21 12.8		28	2 41.8
	9	19 26.8		28	21 24.1		14	10 29.7		1	16 4.9
	13	8 43.0	April	1	10 32.4		18	23 46.4	Sept.	4	5 28.1
	16	21 57.8		4	23 39.8		22	13 4.2		8	18 51.4
								2 21.8			8 14.8
	20	11 12.9		8	12 48.7		25	15 40.6		11	21 38.3
	24	0 26.6		12	1 56.8		29	4 59.3			
	27	13 40.7		15	15 6.0	July	2	18 18.6			
Feb.	31	2 53.1		19	4 14.5		6	7 38.0	Nov.	14	22 43.7
	3	16 6.2		22	17 24.6		9	20 58.1		18	12 6.7
	7	5 17.6		26	6 34.1		13	10 18.2		22	1 29.6
	10	18 29.5		29	19 44.9		16	23 39.0		25	14 52.3
	14	7 40.1	May	3	8 55.3		20	12 59.8		29	4 14.8
	17	20 50.9		6	22 7.1		24	2 21.1	Dec.	2	17 37.2
	21	10 0.5		10	11 18.6		27	15 42.4		6	6 59.4
	24	23 10.5		14	0 31.4		31	5 4.2		9	20 21.3
	28	12 19.3		17	13 43.9	Aug.	3	18 26.1		13	9 43.0
March	4	1 28.5		21	2 57.9		7	7 48.4		16	23 4.6
	7	14 36.5		24	16 11.5		10	21 10.7		20	12 25.8
	11	3 45.2		28	5 26.4		14	10 33.2		24	1 46.9
	14	16 52.8		31	18 41.2		17	23 55.9		27	15 7.8
	18	6 1.1	June	4	7 57.0		21	13 18.7		31	4 28.3

## SATELLITE III.

Jan.	7	h m	March	27	h m	June	13	h m	Aug.	31	h m
	14	19 14.8	April	3	9 6.2		21	20 39.2		7	18 48.2
	21	23 0.3		10	12 23.7		28	0 36.0	Sept.		23 12.2
	29	2 40.8		17	15 43.3	July	5	4 36.1			
Feb.	5	6 16.3		24	19 5.9		12	8 39.8			
								12 46.7	Nov.	18	19 38.2
	12	9 47.7	May	1	22 32.6		19	16 56.5			
	19	13 14.4		9	2 2.9		26	21 9.6	Dec.	26	0 1.4
	26	16 38.1		16	5 37.5	Aug.	3	1 25.4		3	4 23.4
March	5	19 58.6		23	9 16.0		10	5 43.7		10	8 43.0
	12	23 17.2		30	12 59.0		17	10 3.6		17	13 0.5
										24	17 16.3
	20	2 33.7	June	6	16 46.8		24	14 25.2		31	21 28.6

## SATELLITE IV.

Jan.	10	h m	April	3	h m	June	25	h m	Nov.	24	h m
	26	4 4.5		19	8 11.9		12	16 7.6		11	4 2.8
Feb.	12	20 52.7	May	6	22 36.7	July	29	10 38.5	Dec.	27	0 6.0
March	1	12 42.4		23	13 39.2		15	5 48.8			19 41.9
	17	3 40.3	June	8	5 33.5	Aug.	31	1 31.0			
		18 1.9			22 23.4			21 37.4			

## WASHINGTON MEAN TIME.

## JANUARY.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	1	36	41.2	I.	11	6	31		III.	21	17	1	46.1	III.*	21	17	1	46.1	III.*
	4	42		IV.		10	41		II.		19	48	1.0	III.		19	48	1.0	III.
	5	4		I.		13	11		II.*		21	45		III.		21	45		III.
	7	4		IV.		13	20		II.*		22	0	16	III.		22	0	16	III.
	22	43		I.		15	42		II.*		2	31		II.		2	31		II.
	23	57		I.		16	26	7.6	I.*		4	54		II.		4	54		II.
2	1	0		I.		19	51		I.		5	9		II.		5	9		II.
	2	13		I.		12	13	33	I.*		7	15	32.1	I.		7	15	32.1	I.
	13	7	39.1	II.*		14	46		I.*		7	23		II.		7	23		II.
	18	10		II.*		15	49		I.*		10	36		I.		10	36		I.
	20	4	54.1	I.		17	0		I.*		23	4	23	I.		23	4	23	I.
	23	32		I.		18	5	0 55.5	II.		5	31		I.		5	31		I.
8	17	11		I.*		9	58		II.		6	39		I.		6	39		I.
	18	26		I.*		10	54	20.7	I.		7	46		I.		7	46		I.
	18	55		III.		14	19		I.*		20	53	39.4	II.		20	53	39.4	II.
	19	28		I.		14	8	1	I.		24	1	41	II.		24	1	41	II.
	20	41		I.		9	13		I.		1	43	45.0	I.		1	43	45.0	I.
	21	54		III.		10	18		I.		5	3		I.		5	3		I.
4	0	2		III.		11	28		I.*		22	51		I.		22	51		I.
	2	40		III.		13	3	34.7	III.*		23	59		I.		23	59		I.
	8	8		II.		15	50	55.3	III.*		25	1	8	I.		25	1	8	I.
	10	40		II.		17	58		III.*		2	13		I.		2	13		I.
	10	47		II.		20	32		III.		6	47		III.		6	47		III.
	13	12		II.*		23	58		II.		9	44		III.		9	44		III.
	14	33	11.0	I.*		15	2	26	II.		11	28		III.*		11	28		III.*
	18	0		I.*		2	36		II.		13	57		III.*		13	57		III.*
5	11	40		I.		4	56		II.		15	48		III.*		15	48		III.*
	12	54		I.*		5	22	35.0	I.		18	6		II.*		18	6		II.*
	13	56		I.*		8	46		I.		18	25		II.*		18	25		II.*
	15	9		I.*		16	2	30	I.		20	12	1.6	I.		20	12	1.6	I.
	2	25	38.2	II.		3	41		I.		20	35		II.		20	35		II.
	7	27		II.		4	46		I.		23	31		I.		23	31		I.
	9	1	24.0	I.		5	56		I.		26	9	46	IV.		26	9	46	IV.
	12	29		I.*		18	18	10.2	II.*		11	17	11.5	IV.*		11	17	11.5	IV.*
7	6	8		I.		23	13		II.		17	20		I.*		17	20		I.*
	7	22		I.		23	50	47.6	I.		18	26		I.*		18	26		I.*
	8	24		I.		17	3	14	I.		19	36		I.		19	36		I.
	9	6	1.0	III.		20	58		I.		20	41		I.		20	41		I.
	9	37		I.		22	9		I.		27	10	11	II.		27	10	11	II.
	11	54	27.0	III.		22	43		IV.		14	40	15.7	I.*		14	40	15.7	I.*
	14	7		III.*		23	14		I.		14	55		II.*		14	55		II.*
	16	44		III.*		18	0	24	I.		17	58		I.*		17	58		I.*
	21	25		II.		0	52		IV.		11	48		I.*		11	48		I.*
	23	56		II.		2	50		III.		12	54		I.*		12	54		I.*
8	0	3		II.		5	48		III.		14	4		I.*		14	4		I.*
	2	27		II.		7	44		III.		15	8		I.*		15	8		I.*
	3	29	38.5	I.		10	16		III.		20	59	24.1	III.		20	59	24.1	III.
	6	56		I.		13	14		II.*		23	44	33.1	III.		23	44	33.1	III.
9	0	36		I.		15	40		II.*		29	1	27	III.		29	1	27	III.
	1	50		I.		15	52		II.*		3	55		III.		3	55		III.
	2	53		I.		18	10		II.*		5	4		II.		5	4		II.
	4	5		I.		18	19	4.1	I.*		7	19		II.		7	19		II.
	15	42	50.0	II.*		21	42		I.		7	42		II.		7	42		II.
	15	43	4.0	IV.*		19	15	26	I.*		9	8	30.5	I.		9	8	30.5	I.
	17	31	12.3	IV.*		16	36		I.*		9	48		II.		9	48		II.
	20	42		II.		17	43		I.*		12	25		I.*		12	25		I.*
	21	57	51.1	I.		18	51		I.		6	17		I.		6	17		I.
10	1	23		I.		20	7	36	II.		7	21		I.		7	21		I.
	19	5		I.		12	28	21.7	II.*		8	33		I.		8	33		I.
	20	18		I.		12	47	17.4	I.*		9	35		I.		9	35		I.
	21	21		I.		16	9		I.*		23	29	18.2	II.		23	29	18.2	II.
	22	33		I.		21	9	55	I.		3	36	44.2	I.		3	36	44.2	I.
	22	52		III.		11	4		I.*		4	7		II.		4	7		II.
11	1	52		III.		12	11		I.*		6	52		I.		6	52		I.
	3	56		III.		13	18		I.*										

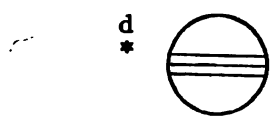
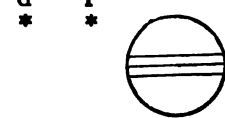

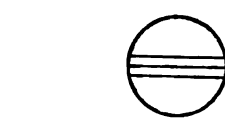
NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

JANUARY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I. 	III. 
II. 	IV. 

*Configurations at 15<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.	East.
1	2°	○ 4° 1° 3
2	4° 1° 2	○ 3°
3	4°	○ 1° 3° 2°
4	4° 3° 2° 1°	○
5	○ 1° 4° 3° 2°	○
6	4° 3°	○ 1° 2°
7	4° 1°	○ 2° 3°
8	4° 2°	○ 1° 3°
9	1° 2°	○ 3°
10		○ 1° 4° 3° 2°
11	○ 2° 3° 1°	○ 4°
12	○ 1° 3° 2°	○ 4°
13	3°	○ 1° 2° 4°
14	1° 3°	○ 2° 4°
15	2°	○ 1° 3° 4°
16	1° 2°	○ 3° 4°
17		○ 1° 3° 4°
18	1° 2° 4° 2°	
19	3° 4° 2°	○ 1°
20	4° 3°	○ 2° 1°
21	4° 3° 1°	○ 2°
22	4° 2°	○ 1° 3°
23	4° 1°	○ 3°
24	4°	○ 1° 2° 3°
25	4° 1° 3° 2°	
26	3° 2° 4°	○ 1°
27	3° 1°	○ 4° 2°
28	○ 1° 3°	○ 2° 4°
29	2°	○ 1° 3° 4°
30	2° 1°	○ 3° 4°
31		○ 1° 2° 3° 4°

## WASHINGTON MEAN TIME.

## FEBRUARY.

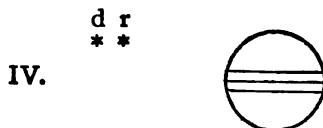
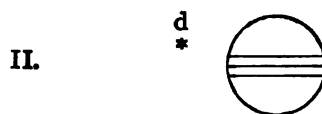
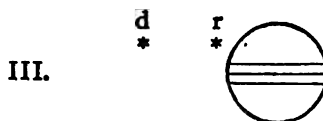
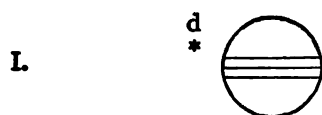
d	h	m	s				d	h	m	s				d	h	m	s				
1	0	45		I.	Sh.	In.	9	22	3		I.	Tr.	In.	19	14	20		II.*	Tr.	In.	
1	48		I.	Tr.	In.		23	23			I.	Sh.	Eg.		14	26		III.*	Oc.	Re.	
3	1		I.	Sh.	Eg.		10	0	17		I.	Tr.	Eg.		14	47	42.1	I.*	Ec.	Dis.	
4	2		I.	Tr.	Eg.		15	23	36.4		II.*	Ec.	Dis.		15	20		II.*	Sh.	Eg.	
10	45		III.*	Sh.	In.		18	26	18.2		I.*	Ec.	Dis.		16	48		II.*	Tr.	Eg.	
13	41		III.*	Sh.	Eg.		19	44			II.	Oc.	Re.		17	45		I.*	Oc.	Re.	
15	8		III.*	Tr.	In.		21	33			I.	Oc.	Re.	20	10	49		IV.*	Sh.	In.	
17	35		III.*	Tr.	Eg.		11	15	35		I.*	Sh.	In.		11	58		I.*	Sh.	In.	
18	21		II.*	Sh.	In.		16	29			I.*	Tr.	In.		12	25		IV.*	Sh.	Eg.	
20	30		II.	Tr.	In.		17	51			I.*	Sh.	Eg.		12	42		I.*	Tr.	In.	
20	58		II.	Sh.	Eg.		18	43			I.	Tr.	Eg.		14	13		I.*	Sh.	Eg.	
22	5	1.3	I.	Ec.	Dis.		12	3	52	50.0		IV.	Ec.	Dis.		14	56		I.*	Tr.	Eg.
22	59		II.	Tr.	Eg.		4	54	32.0		III.	Ec.	Dis.	21	7	17	13.0	II.	Ec.	Dis.	
2	1	19	I.	Oc.	Re.		5	1	7.0		IV.	Ec.	Re.		9	15	59.1	I.*	Ec.	Dis.	
19	13		I.	Sh.	In.		7	37	27.5		III.	Ec.	Re.		11	14		II.*	Oc.	Re.	
20	15		I.	Tr.	In.		8	36			III.	Oc.	Dis.		12	11		I.*	Oc.	Re.	
21	30		I.	Sh.	Eg.		10	11			II.*	Sh.	In.	22	6	26		I.	Sh.	In.	
22	29		I.	Tr.	Eg.		11	0			III.*	Oc.	Re.		7	9		I.	Tr.	In.	
8	12	47	42.3	II.*	Ec.	Dis.	12	2			II.*	Tr.	In.		8	42		I.	Sh.	Eg.	
16	33	16.0	I.*	Ec.	Dis.		12	47			II.*	Sh.	Eg.		9	23		I.*	Tr.	Eg.	
16	46		IV.*	Sh.	In.		12	54	34.3		I.*	Ec.	Dis.		22	40		III.	Sh.	In.	
17	20		II.*	Oc.	Re.		14	30			II.*	Tr.	Eg.	23	1	33		III.	Sh.	Eg.	
18	39		IV.*	Sh.	Eg.		15	59			I.*	Oc.	Re.		1	39		III.	Tr.	In.	
19	46		I.	Oc.	Re.		18	10	4		I.*	Sh.	In.		2	0		II.	Sh.	In.	
4	13	42	I.*	Sh.	In.		10	56			I.*	Tr.	In.		3	28		II.	Tr.	In.	
14	42		I.*	Tr.	In.		12	20			I.*	Sh.	Eg.		3	44	18.2	I.	Ec.	Dis.	
15	58		I.*	Sh.	Eg.		13	10			I.*	Tr.	Eg.		4	3		III.	Tr.	Eg.	
16	56		I.*	Tr.	Eg.		14	4	41	5.1	II.	Ec.	Dis.		4	36		II.	Sh.	Eg.	
5	0	57	8.5	III.	Ec.	Dis.	7	22	49.8		I.	Ec.	Dis.		5	56		II.	Tr.	Eg.	
3	41	11.1	III.	Ec.	Re		8	54			II.	Oc.	Re.		6	37		I.	Oc.	Re.	
5	3		III.	Oc.	Dis.		10	26			I.*	Oc.	Re.	24	0	55		I.	Sh.	In.	
7	29		III.	Oc.	Re.		15	4	32		I.	Sh.	In.		1	35		I.	Tr.	In.	
7	37		II.	Sh.	In.		5	23			I.	Tr.	In.		3	10		I.	Sh.	Eg.	
9	41		II.	Tr.	In.		6	48			I.	Sh.	Eg.		3	49		I.	Tr.	Eg.	
10	14		II.*	Sh.	Eg.		7	37			I.	Tr.	Eg.		20	35	53.4	II.	Ec.	Dis.	
11	1	31.2	I.*	Ec.	Dis.		18	42			III.	Sh.	In.		22	12	37.0	I.	Ec.	Dis.	
12	9		II.*	Tr.	Eg.		21	36			III.	Sh.	Eg.	25	0	25		II.	Oc.	Re.	
14	13		I.*	Oc.	Re.		22	14			III.	Tr.	In.		1	4		I.	Oc.	Re.	
6	8	10	I.	Sh.	In.		23	27			II.	Sh.	In.		19	23		I.	Sh.	In.	
9	9		I.	Tr.	In.		16	0	38		III.	Tr.	Eg.		20	1		I.	Tr.	In.	
10	26		I.*	Sh.	Eg.		1	11			II.	Tr.	In.		21	39		I.	Sh.	Eg.	
11	23		I.*	Tr.	Eg.		11	51	8.0		I.	Ec.	Dis.		22	15		I.	Tr.	Eg.	
7	2	5	6.7	II.	Ec.	Dis.	2	3			II.	Sh.	Eg.	26	12	49	53.4	III.*	Ec.	Dis.	
5	29	45.7	I.	Ec.	Dis.		3	39			II.	Tr.	Eg.		15	17		II.*	Sh.	In.	
6	32		II.	Oc.	Re.		4	52			I.	Oc.	Re.		16	36		II.*	Tr.	In.	
8	39		I.	Oc.	Re.		23	1			I.	Sh.	In.		16	40	55.3	I.*	Ec.	Dis.	
2	39		I.	Sh.	In.		23	49			I.	Tr.	In.		17	50		III.*	Oc.	Re.	
3	36		I.	Tr.	In.		17	1	17		I.	Sh.	Eg.		17	53		II.*	Sh.	Eg.	
4	55		I.	Sh.	Eg.		2	3			I.	Tr.	Eg.		19	4		II.	Tr.	Eg.	
5	50		I.	Tr.	Eg.		17	59	40.6		II.*	Ec.	Dis.		19	30		I.	Oc.	Re.	
14	43		III.*	Sh.	In.		20	19	25.2		I.	Ec.	Dis.	27	13	51		I.*	Sh.	In.	
17	38		III.*	Sh.	Eg.		22	5			II.	Oc.	Re.		14	28		I.*	Tr.	In.	
18	42		III.	Tr.	In.		23	19			I.	Oc.	Re.		16	7		I.*	Sh.	Eg.	
20	54		II.	Sh.	In.		18	17	29		I.*	Sh.	In.		16	42		I.*	Tr.	Eg.	
21	7		III.	Tr.	Eg.		18	16			I.*	Tr.	In.	28	9	53	30.0	II.*	Ec.	Dis.	
22	52		II.	Tr.	In.		19	45			I.	Sh.	Eg.		11	9	13.6	I.*	Ec.	Dis.	
23	31		II.	Sh.	Eg.		20	30			I.	Tr.	Eg.		13	33		II.*	Oc.	Re.	
23	58	3.1	I.	Ec.	Dis.		19	8	51	59.2		III.	Ec.	Dis.		13	56		I.*	Oc.	Re.
9	1	20	II.	Tr.	Eg.		11	33	47.4		III.*	Ec.	Re.		22	5	56.1	IV.	Ec.	Dis.	
3	6		I.	Oc.	Re.		12	3			III.*	Oc.	Dis.		22	39	21.0	IV.	Ec.	Re.	
21	7		I.	Sh.	In.		12	44			II.*	Sh.	In.								

NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

## FEBRUARY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.**Configurations at 14<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.			East.		
1		'1	○ 3'	2'		4'
2		3' 2'	○	1'		4'
3		'3	'1 2○	4'		
4		'3	4' ○ 1'	2'		
5		4'	2' ○	'3		'1 ●
6	4'	'2	1' ○		'3	
7	4'		○	'1 2	3'	
8	'4		1' ○	3' 2'		
9	'4	3' 2'	○	1'		
10	'4 3'	'1 2	○			
11		'4	○	1' 2		
12	○ 2'		○	'3		'1 ● '4 ●
13		'2	1' ○	'4 '3		
14			○	'1 2	3' 4'	
15		1'	○	3' 2'		4'
16		'3	○	'1		4'
17	3'	'1 2	○			4'
18	'3		○	1' 2	4'	
19	○ 2'		'1 ○		4'	'3 ●
20	○ 1'	'2	○	4' 3'		
21		4'	○	'1 3'		
22	4'	1'	○	3' 2'		
23	4'	'3	○	'1		
24	4'	3'	'1 ○			
25	'4	'3	○	1' 2		
26	'4		'1 3○ 2'			
27		4' 2'	○ 1'	'3		
28		'4	○ 1	3'		

WASHINGTON MEAN TIME.											
MARCH.											
d	h	m	s	I.	Sh.	In.	d	h	m	s	I.
1	8	20		I.	Sh.	In.	11	4	32		II.
	8	54		I.*	Tr.	In.		4	59		II.
	10	36		I.*	Sh.	Eg.		23	11		I.
	11	8		I.*	Tr.	Eg.		23	31		I.
2	2	39		III.	Sh.	In.	12	1	27		I.
	4	34		II.	Sh.	In.		1	45		I.
	5	2		III.	Tr.	In.		20	24		II.
	5	30		III.	Sh.	Eg.		20	27	40.1	I.
	5	37	34.2	I.	Ec.	Dis.		20	46	38.0	III.
	5	43		II.	Tr.	In.		21	4		II.
	7	9		II.	Sh.	Eg.		22	58		I.
	7	26		III.	Tr.	Eg.		22	59		II.
	8	11		II.	Tr.	Eg.		23	32		II.
	8	22		I.*	Oc.	Re.	13	0	30		III.
	8	248		I.	Sh.	In.		17	39		I.*
	3	20		I.	Tr.	In.		17	57		I.
	5	4		I.	Sh.	Eg.		19	55		I.
	5	34		I.	Tr.	Eg.		20	11		I.
	23	12	15.2	II.	Ec.	Dis.	14	14	56	2.0	I.*
4	0	5	54.6	I.	Ec.	Dis.		15	6	29.8	II.*
	2	42		II.	Oc.	Re.		17	24		I.*
	2	48		I.	Oc.	Re.		18	7		II.
	21	17		I.	Sh.	In.	15	12	8		I.*
	21	46		I.	Tr.	In.		12	23		I.*
	23	33		I.	Sh.	Eg.		14	24		I.*
5	0	0		I.	Tr.	Eg.		14	37		I.*
	16	47	53.6	III.*	Ec.	Dis.	16	9	24	25.7	I.*
	17	51		II.*	Sh.	In.		9	41		II.*
	18	34	14.2	I.	Ec.	Dis.		10	10		II.*
	18	50		II.	Tr.	In.		10	35		III.*
	20	26		II.	Sh.	Eg.		11	37		III.*
	21	11		III.	Oc.	Re.		11	50		I.*
	21	14		I.	Oc.	Re.		12	16		II.*
	21	18		II.	Tr.	Eg.		12	38		II.*
6	15	45		I.*	Sh.	In.		13	24		III.*
	16	12		I.*	Tr.	In.		14	3		III.*
	18	1		I.*	Sh.	Eg.	17	6	37		I.
	18	26		I.	Tr.	Eg.		6	49		I.
7	12	29	55.7	II.*	Ec.	Dis.		8	52		I.*
	13	2	34.4	I.*	Ec.	Dis.		9	3		I.*
	15	40		I.*	Oc.	Re.	18	3	52	50.1	I.
	15	50		II.*	Oc.	Re.		4	25	23.1	II.
8	10	14		I.*	Sh.	In.		6	15		I.
	10	39		I.*	Tr.	In.		7	15		II.*
	12	30		I.*	Sh.	Eg.	19	1	5		I.
	12	53		I.*	Tr.	Eg.		1	15		I.
9	4	55		IV.	Sh.	In.		3	21		I.
	6	10		IV.	Sh.	Eg.		3	29		I.
	6	36		III.	Sh.	In.		22	21	13.1	I.
	7	7		II.	Sh.	In.		22	58		II.
	7	30	56.3	I.	Ec.	Dis.		23	16		II.
	7	57		II.*	Tr.	In.	20	0	41		I.
	8	20		III.*	Tr.	In.		0	44	54.0	III.
	9	27		III.*	Sh.	Eg.		1	33		II.
	9	42		II.*	Sh.	Eg.		1	44		II.
	10	6		I.*	Oc.	Re.		3	47		III.
	10	25		II.*	Tr.	Eg.		19	34		I.
	10	45		III.*	Tr.	Eg.		19	41		I.
10	4	42		I.	Sh.	In.		21	49		I.
	5	5		I.	Tr.	In.		21	55		I.
	6	58		I.	Sh.	Eg.	21	16	49	37.0	I.*
	7	19		I.	Tr.	Eg.		17	43	11.2	II.*
11	1	48	45.5	II.	Ec.	Dis.		19	7		I.
	1	59	18.7	I.	Ec.	Dis.					

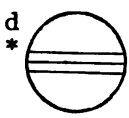
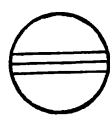
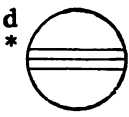
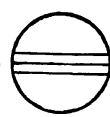
NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

## MARCH.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.		III.	
II.		IV. No Eclipse.	

*Configurations at 12<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West	East.
1		I' O '4 '2
2		'2 O '1 '4
3	3' '2 I'	O '4
4	'3	O I' '2 '4
5		'1 '3 O 2' 4'
6	2'	O I' '3 4'
7		I' O '3 4'
8	O I'	O '2 '3
9	O 4'	'2 O '1
10	3' 4' '2 I'	O
11	4' '3	O '1
12	4' '1	O 2'
13	4' 2'	O I' '3
14	'4 '1	O '3
15	O I' '4	O '2 3'
16	O 2' O 3' '4	O '1
17	3' '2 I' '4	O
18	'3	O '2 '1 '4
19	'1	O 2' '4
20	2'	O '1 '4
21	'1	O '3 '4
22		O I' '2 3' 4'
23	O 2'	O 3' 4' '1
24	3' '2 I'	O 4'
25	'3	O '1 '4
26	'3 '1 4'	O 2'
27	4' 2'	O '3 I'
28	4' '1	O '3
29	4'	O I' '2 3'
30	'4	'1 O 2' 3'
31	'4 '2	I' O

WASHINGTON MEAN TIME.											
APRIL.											
d	h	m	s				d	h	m	s	
1	7	28		I.*	Oc.	Dis.	11	3	8		I.
	9	18		II.*	Oc.	Dis.		3	32		I.
	9	50	36.5	I.*	Ec.	Re.		22	4		I.
	12	8	20.0	II.*	Ec.	Re.	12	0	41	24.5	I.
2	4	43		I.	Tr.	In.		0	42		II.
	4	54		I.	Sh.	In.		4	2	37.6	II.
	6	57		I.*	Tr.	Eg.		19	20		I.
	7	9		I.*	Sh.	Eg.		19	46		I.
3	1	54		I.	Oc.	Dis.		21	34		I.
	3	41		II.	Tr.	In.		22	1		I.
	4	5		II.	Sh.	In.	13	16	30		I.
	4	19	2.5	I.	Ec.	Re.		19	1		II.
	6	11		II.	Tr.	Eg.		19	9	54.0	I.
	6	39		II.	Sh.	Eg.		19	56		II.
	7	50		III.*	Oc.	Dis.		21	32		II.
	11	16	23.4	III.*	Ec.	Re.		22	30		II.
	23	9		I.	Tr.	In.	14	0	43		III.
	23	22		I.	Sh.	In.		2	31		III.
4	1	23		I.	Tr.	Eg.		3	19		III.
	1	38		I.	Sh.	Eg.		5	15		III.
	20	20		I.	Oc.	Dis.		13	46		I.*
	22	25		II.	Oc.	Dis.		14	14		I.*
	22	47	29.7	I.	Ec.	Re.		16	1		I.*
5	1	26	3.1	II.	Ec.	Re.		16	30		I.
	17	35		I.	Tr.	In.	15	10	56		I.*
	17	51		I.	Sh.	In.		13	38	26.2	I.*
	19	49		I.	Tr.	Eg.		13	50		II.*
	20	6		I.	Sh.	Eg.		17	21	26.8	II.
6	14	46		I.*	Oc.	Dis.	16	8	13		I.*
	16	48		II.*	Tr.	In.		8	43		I.*
	17	15	57.6	I.	Ec.	Re.		10	27		I.*
	17	22		II.	Sh.	In.		10	58		I.*
	19	18		II.	Tr.	Eg.	17	5	22		I.
	19	56		II.	Sh.	Eg.		8	6	55.0	I.*
	21	25		III.	Tr.	In.		8	9		II.*
	22	32		III.	Sh.	In.		9	14		II.*
	23	58		III.	Tr.	Eg.		10	40		II.*
7	1	17		III.	Sh.	Eg.		11	47		II.*
	12	1		I.*	Tr.	In.		14	25		III.*
	12	20		I.*	Sh.	In.		19	11	10.8	III.
	14	16		I.*	Tr.	Eg.	18	2	39		I.
	14	35		I.*	Sh.	Eg.		3	12		I.
	9	12		I.*	Oc.	Dis.		4	53		I.
8	11	34		II.*	Oc.	Dis.		5	27		I.
	11	44	27.5	I.*	Ec.	Re.		23	49		I.
	14	44	51.7	II.*	Ec.	Re.	19	2	35	27.2	I.
	6	28		I.	Tr.	In.		2	59		II.
	6	48		I.	Sh.	In.		6	39	15.0	II.
	8	42		I.*	Tr.	Eg.		21	5		I.
	9	4		I.*	Sh.	Eg.		21	40		I.
10	3	38		I.	Oc.	Dis.		23	20		I.
	5	55		II.	Tr.	In.		23	56		I.
	6	12	55.4	I.	Ec.	Re.	20	18	15		I.
	6	39		II.	Sh.	In.		21	3	59.5	I.
	8	25		II.*	Tr.	Eg.		21	16		II.
	9	13		II.*	Sh.	Eg.		22	31		II.
	11	6		III.*	Oc.	Dis.		23	48		II.
	15	13	32.1	III.*	Ec.	Re.	21	1	4		II.
11	0	54		I.	Tr.	In.		4	3		III.
	1	17		I.	Sh.	In.					
21	6	30		III.	Sh.	In.		6	41		III.
	6	41		III.	Tr.	Eg.		9	13		III.*
	9	13		I.*	Tr.	In.		15	32		I.*
	15	32		I.	Sh.	In.		16	9		I.
	17	46		I.	Tr.	Eg.		17	46		I.
	18	24		I.	Sh.	In.		18	24		I.
22	12	41		I.*	Oc.	Dis.		12	41		I.*
	15	32	33.1	I.*	Ec.	Re.		15	32		I.*
	16	9		II.	Oc.	Dis.		16	9		II.
	17	46		II.	Ec.	Re.		17	46		II.
	18	24		I.	Tr.	In.		18	24		I.
	19	58	3.7	I.	Ec.	Re.		19	58		I.
23	9	58		I.*	Tr.	In.		9	58		I.*
	10	38		I.*	Sh.	In.		10	38		I.*
	12	13		I.*	Tr.	Eg.		12	13		I.*
	12	53		I.*	Sh.	Eg.		12	53		I.*
	14	21		II.*	Sh.	Eg.		14	21		II.*
	17	46		III.	Tr.	In.		17	46		III.
	20	26		III.	Oc.	Re.		20	26		III.
	20	37	34.0	III.	Ec.	Dis.		20	37		III.
	23	8	55.1	III.	Ec.	Re.		23	8		III.
25	4	25		I.	Tr.	In.		4	25		I.
	5	7		II.	Oc.	Dis.		5	7		II.
	6	40		I.	Tr.	Eg.		6	40		I.
	7	22		I.*	Sh.	Eg.		7	22		I.*
26	1	34		I.	Oc.	Dis.		1	34		I.
	4	29	38.1	I.	Ec.	Re.		4	29		I.
	5	18		II.	Oc.	Dis.		5	18		II.
	9	15	53.5	II.*	Ec.	Re.		9	15		II.*
	22	51		I.	Tr.	In.		22	51		I.
	23	35		I.	Sh.	In.		23	35		I.
27	1	6		I.	Tr.	Eg.		1	6		I.
	1	50		I.	Sh.	Eg.		1	50		I.
	20	1		I.	Oc.	Dis.		20	1		I.
	22	58	11.1	I.	Ec.	Re.		22	58		I.
	23	34		II.	Tr.	In.		23	34		II.
28	1	5		II.	Sh.	In.		1	5		II.
	2	6		II.	Tr.	Eg.		2	6		II.
	3	38		II.	Sh.	Eg.		3	38		II.
	7	26		III.*	Tr.	In.		7	26		III.*
	10	7		III.*	Tr.	Eg.		10	7		III.*
	10	28		III.*	Sh.	In.		10	28		III.*
	13	11		III.*	Sh.	Eg.		13	11		III.*
	17	18		I.	Tr.	In.		17	18		I.
	18	4		I.	Sh.	In.		18	4		I.
	19	33		I.	Tr.	Eg.		19	33		I.
	20	19		I.	Sh.	Eg.		20	19		I.
29	14	27		I.*	Oc.	Dis.		14	27		I.*
	17	26	47.4	I.	Ec.	Re.		17	26		I.
	18	29		II.	Oc.	Dis.		18	29		II.
	22	34	41.0	II.	Ec.	Re.		22	34		II.
30	11	45		I.*	Tr.	In.		11	45		I.*
	12	33		I.*	Sh.	In.		12	33		I.*
	14	0		I.*	Tr.	Eg.		14	0		I.*
	14	48		I.*	Sh.	Eg.		14	48		I.*

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc. denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.



## WASHINGTON MEAN TIME.

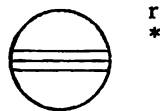
APRIL.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.



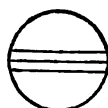
III.



II.



IV. No Eclipse.

*Configurations at 11<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.		East.
1	'4 3'	○ 'I	'2 ●
2	'3 '4 I'	○ 2'	
3	2'	○ <sup>4</sup> / <sub>3</sub> 'I	
4	'2 'I	○	'4 '3
5		○ I' '2 3' '4	
6	'I	○ 2' 3'	'4
7	2' 3'	○ I'	'4
8	3'	○ 'I	4' '2 ●
9	'3 I'	○ 2' 4'	
10	2'	○ 'I 4'	'3 ●
11	'2 I'	○ 4' '3	
12	4'	○ 1' <sup>3</sup> / <sub>2</sub> 3'	
13	4' 'I	○ 2' 3'	
14	4' 2' 3'	○ I'	
15	4' 3' '2	○	'I ●
16	'4 '3 I'	○ '2	
17	'4 <sup>3</sup> / <sub>2</sub>	○ 'I	
18	'4 '2 I'	○ '3	
19	'4	○ '2 'I 3'	
20	'I	○ <sup>4</sup> / <sub>2</sub> 3'	
21	2' 3'	○ I' '4	
22	3' '2 'I	○	'4
23	○ 1' '3	○ '2	'4
24	○ 2' '3	○ 'I 4'	
25	'2 I'	○ '3 4'	
26		○ '2 'I <sup>3</sup> / <sub>4</sub>	
27	'I	○ 4' <sup>3</sup> / <sub>2</sub> 3'	
28	2' 4' <sup>3</sup> / <sub>2</sub>	○ I'	
29	<sup>3</sup> / <sub>4</sub> '2 'I	○	
30	4' '3	○ I' '2	

## WASHINGTON MEAN TIME.

## MAY.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
1	8	54		I.*	11	23	35		I.	22	14	19		I.	24	8	47		I.
	11	55	20.6	I.*		2	46	56.4	I.		17	38		I.		19	51		II.
	12	43		II.*		4	14		II.		19	51		II.		22	8		II.
	14	23		II.*		6	15		II.		22	8		II.		22	25		II.
	15	16		II.		6	48		II.		22	25		II.		22	25		II.
	16	55		II.		8	47		II.*		23	0	39	II.		23	0	39	II.
	21	11		III.		14	24		III.		5	9		IV.		5	9		IV.
	23	54		III.		17	10		III.		5	58		IV.		5	58		IV.
2	0	37	12.2	III.		18	27		III.		7	51		III.*		7	51		III.*
	3	7	32.2	III.		20	54		I.		10	41		III.*		10	41		III.*
	6	12		I.		21	7		III.		11	39		I.*		11	39		I.*
	7	1		I.		21	54		I.		12	34	34.5	III.*		12	34		III.*
	8	27		I.*		23	9		I.		12	46		I.*		12	46		I.*
	9	17		I.*		18	0	9	I.		13	54		I.		13	54		I.
3	3	21		I.		18	3		I.		15	1	9.5	III.		15	1		III.
	6	23	55.8	I.		21	15	36.2	I.		15	2		I.		15	2		I.
	7	39		II.*		23	14		II.		12	7	27.4	I.*		12	7		I.*
	11	52	32.0	II.*		14	3	47	II.		14	54		II.		14	54		II.
4	0	39		I.		15	22		I.		19	42	15.0	II.		19	42		II.
	1	30		I.		16	22		I.		25	6	6	I.		25	6	6	I.
	2	54		I.		17	37		I.		7	15		I.		7	15		I.
	3	45		I.		18	38		I.*		8	22		I.*		8	22		I.*
	21	48		I.		15	44	12.6	I.		9	30		I.*		9	30		I.*
5	0	52	30.4	I.		17	26		II.		26	3	15	I.		26	3	15	I.
	1	53		II.		19	33		II.		6	36	5.3	I.		6	36		I.
	3	40		II.		20	0		II.		9	4		II.*		9	4		II.*
	4	26		II.		22	5		II.		11	25		II.*		11	25		II.*
	6	13		III.*		16	4	14	III.		11	39		II.*		11	39		II.*
	10	52		III.*		7	1		III.		13	57		II.		13	57		II.
	13	37		III.*		8	35	36.0	III.*		21	41		III.		21	41		III.
	14	28		III.*		9	49		I.*		27	0	31	III.		27	0	31	III.
	17	9		III.		10	51		I.*		0	34		I.		0	34		I.
	19	6		I.		11	3	23.1	III.*		1	44		I.		1	44		I.
	19	59		I.		12	4		I.*		2	26		III.		2	26		III.
	21	21		I.		13	6		I.*		2	50		I.		2	50		I.
	22	14		I.		17	6	57	I.		3	59		I.		3	59		I.
6	16	15		I.		10	12	51.3	I.*		5	4		III.		5	4		III.
	19	21	8.6	I.		12	27		II.*		21	42		I.		21	42		I.
	20	51		II.		17	5	44.0	II.		28	1	48.1	I.		28	1		I.
7	1	11	17.3	II.		18	4	16	I.		4	9		II.		4	9		II.
	13	33		I.*		5	20		I.		9	0	49.8	II.*		9	0		II.*
	14	28		I.*		6	31		I.		19	2		I.		19	2		I.
	15	48		I.		7	35		I.*		20	12		I.		20	12		I.
	16	43		I.		19	1	25	I.		21	17		I.		21	17		I.
8	10	41		I.*		4	41	28.4	I.		22	27		I.		22	27		I.
	13	49	43.5	I.*		6	38		II.		29	16	10	I.		29	16	10	I.
	15	3		II.		8	50		II.*		19	33	26.8	I.		19	33		I.
	16	58		II.		9	12		II.*		22	18		II.		22	18		II.
	17	37		II.		11	22		II.*		30	0	43	II.		30	0	43	II.
	19	30		II.		18	0		III.		0	53		II.		0	53		II.
9	0	40		III.		20	48		III.		3	14		II.		3	14		II.
	3	26		III.		22	27		III.		11	34		III.*		11	34		III.*
	4	36	20.6	III.		22	44		I.		13	30		I.		13	30		I.
	7	5	19.4	III.		23	49		I.		14	24		III.		14	24		III.
	8	0		I.*		30	0	59	I.		14	41		I.		14	41		I.
	8	56		I.*		1	6		III.		15	45		I.		15	45		I.
	10	15		I.*		2	4		I.		16	33	38.1	III.		16	33		III.
	11	12		I.		19	52		I.		16	56		I.		16	56		I.
10	5	8		I.*		23	10	9.8	I.		18	59	0.7	III.		18	59		III.
	8	18	20.4	I.*		21	1	41	II.		31	10	38	I.*		31	10	38	I.*
	10	2		II.*		6	24	23.2	II.		11	33		IV.*		11	33		IV.*
	14	29	10.1	II.*		17	11		I.		12	45		I.*		12	45		I.*
11	2	27		I.		18	17		I.		14	2	8.0	I.		14	2		I.
	3	25		I.		19	26		I.		17	24		II.		17	24		II.
	4	42		I.		20	32		I.		22	18	40.6	II.		22	18		II.
	5	40		I.					I.					II.					II.

NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

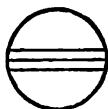
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

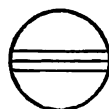
MAY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

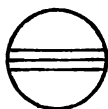
I.



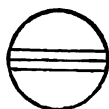
III.



II.



IV. No Eclipse.

*Configurations at 11<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1	4'		'3	○ 2'			'1 ●	
2	'4		2' 1'	○	'3			
3	'4		<del>2' 1'</del>	○	'1' '2'	'3		
4		'4	1'	○	2' 3'			
5	○ 3'		'4 2'	○	1'			
6			3' '2' '1'	'4 ○				
7		'3		○ 1'	2 <sup>4</sup>			
8			'3	○ 2'		'4	'1 ●	
9		2'	1'	○	'3		'4	
10				○	'1	'3	'4'2 ●	
11			1'	○	2' 3'		4'	
12			2'	○ 3'	'1		4'	
13		3' '2'	'1'	○		4'		
14		'3		○	1 <sup>4</sup> '2			
15		'3 4'	'1'	○ 2'				
16	○ 1'	4'	2'	○ '3				
17		4'		'2 ○ '1	'3			
18	4'		1'	○	'2 3'			
19	'4		2'	○	2 <sup>1</sup>			
20	'4		2 <sup>3</sup> '1'	○				
21		4 <sup>3</sup>		○	1 <sup>2</sup>			
22		'3 '4	'1'	○ 2'				
23		2'		○ 1' '4			'3 ●	
24			'2	○		4 <sup>3</sup>	'1 ●	
25			1'	○	'2 3'	'4		
26	○ 2'			○	1 <sup>3</sup>		'4	
27		'2 3 <sup>1</sup>		○			'4'	
28		3'		○	'2 1'		4'	
29		'3	'1'	○	2'	4'		
30		2'	'3	○ 1'	4'			
31		'2	○ 4'		'3		'1 ●	

WASHINGTON MEAN TIME.																				
JUNE.																				
d	h	m	s	I.*	Tr.	In.	d	h	m	s	II.*	Oc.	Re.	d	h	m	s	III.	Oc.	Dis.
1	7	58		I.*	Sh.	In.	11	11	48		II.*	Ec.	Dis.	20	23	9		III.	Oc.	Re.
	9	10		I.*	Sh.	In.		11	48	13.8	II.*	Ec.	Dis.	21	2	3		III.	Oc.	Re.
	10	13		I.*	Tr.	Eg.		14	13	23.2	II.	Ec.	Re.		4	32	48.7	III.	Ec.	Dis.
	11	25		I.*	Sh.	Eg.		22	47		I.	Tr.	In.		6	54	32.5	III.	Ec.	Re.
2	5	6		I.	Oc.	Dis.	12	0	3		I.	Sh.	In.		16	18		I.	Oc.	Dis.
	9	30	47.0	I.*	Ec.	Re.		1	3		I.	Tr.	Eg.		19	46	31.8	I.	Ec.	Re.
	11	33		II.*	Tr.	In.		2	17		I.	Sh.	Eg.		1	4		II.	Oc.	Dis.
	14	1		II.	Sh.	In.		19	55		I.	Oc.	Dis.		3	40		II.	Oc.	Re.
	14	8		II.	Tr.	Eg.		23	22	57.7	I.	Ec.	Re.		3	42	31.8	II.	Ec.	Dis.
	16	32		II.	Sh.	Eg.	18	3	20		II.	Tr.	In.		6	7	13.4	II.	Ec.	Re.
3	1	26		III.	Tr.	In.		5	54		II.	Sh.	In.		13	38		I.	Tr.	In.
	2	26		I.	Tr.	In.		5	56		II.	Tr.	Eg.		14	55		I.	Sh.	In.
	3	39		I.	Sh.	In.		8	25		II.*	Sh.	Eg.		15	54		I.	Tr.	Eg.
	4	17		III.	Tr.	Eg.		17	15		I.	Tr.	In.		17	10		I.	Sh.	Eg.
	4	42		I.	Tr.	Eg.		18	31		I.	Sh.	In.		23	10	46	I.*	Oc.	Dis.
	5	53		I.	Sh.	Eg.		19	13		III.	Oc.	Dis.		14	15	12.3	I.	Ec.	Re.
	6	26		III.	Sh.	In.		19	31		I.	Tr.	Eg.		19	12		II.	Tr.	In.
	9	3		III.*	Sh.	Eg.		20	46		I.	Sh.	Eg.		21	48		II.	Sh.	In.
	23	34		I.	Oc.	Dis.		22	6		III.	Oc.	Re.		21	49		II.	Tr.	Eg.
4	2	59	31.0	I.	Ec.	Re.	14	0	32	40.3	III.	Ec.	Dis.	24	0	18		II.	Sh.	Eg.
	6	39		II.	Oc.	Dis.		2	55	37.1	III.	Ec.	Re.		8	7		I.*	Tr.	In.
	11	37	10.0	II.*	Ec.	Re.		14	23		I.	Oc.	Dis.		9	24		I.*	Sh.	In.
	20	54		I.	Tr.	In.		17	51	41.0	I.	Ec.	Re.		10	23		I.*	Tr.	Eg.
	22	7		I.	Sh.	In.		22	29		II.	Oc.	Dis.		11	38		I.	Sh.	Eg.
	23	10		I.	Tr.	Eg.	15	1	4		II.	Oc.	Re.		13	6		III.	Tr.	In.
5	0	22		I.	Sh.	Eg.		1	6	14.1	II.	Ec.	Dis.		16	0		III.	Tr.	Eg.
	18	2		I.	Oc.	Dis.		3	31	11.0	II.	Ec.	Re.		18	24		III.	Sh.	In.
	21	28	10.5	I.	Ec.	Re.		11	44		I.*	Tr.	In.		20	57		III.	Sh.	Eg.
6	0	48		II.	Tr.	In.		13	0		I.	Sh.	In.		25	5	15	I.	Oc.	Dis.
	3	19		II.	Sh.	In.		14	0		I.	Tr.	Eg.		8	43	58.7	I.*	Ec.	Re.
	3	24		II.	Tr.	Eg.		15	15		I.	Sh.	Eg.		14	23		II.	Oc.	Dis.
	5	49		II.	Sh.	Eg.	16	8	52		I.*	Oc.	Dis.		15	14		IV.	Oc.	Dis.
	15	21		III.	Oc.	Dis.		12	20	21.0	I.	Ec.	Re.		16	59		II.	Oc.	Re.
	15	22		I.	Tr.	In.		16	37		II.	Tr.	In.		17	1		IV.	Oc.	Re.
	16	36		I.	Sh.	In.		19	12		II.	Sh.	In.		17	1	4.6	II.	Ec.	Dis.
	17	38		I.	Tr.	Eg.		19	13		II.	Tr.	Eg.		19	25	23.6	II.	Ec.	Re.
	18	13		III.	Oc.	Re.		21	41		II.	Sh.	Eg.	26	2	36		I.	Tr.	In.
	18	50		I.	Sh.	Eg.		4	35		IV.	Tr.	In.		3	52		I.	Sh.	In.
	20	33	9.0	III.	Ec.	Dis.		6	12		I.	Tr.	In.		4	52		I.	Tr.	Eg.
	22	57	19.0	III.	Ec.	Re.		6	16		IV.	Tr.	Eg.		6	7		I.	Sh.	Eg.
7	12	30		I.*	Oc.	Dis.		7	29		I.	Sh.	In.		23	44		I.	Oc.	Dis.
	15	56	52.8	I.	Ec.	Re.		8	28		I.*	Tr.	Eg.	27	3	12	40.1	I.	Ec.	Re.
	19	55		II.	Oc.	Dis.		9	9		III.*	Tr.	In.		8	31		II.*	Tr.	In.
8	0	54	59.6	II.	Ec.	Re.		9	44		I.*	Sh.	Eg.		11	6		II.*	Sh.	In.
	9	50		I.*	Tr.	In.		12	2		III.	Tr.	Eg.		11	7		II.*	Tr.	Eg.
	11	5		I.*	Sh.	In.		14	25		III.	Sh.	In.		13	36		II.	Sh.	Eg.
	12	6		I.*	Tr.	Eg.		16	59		III.	Sh.	Eg.		21	5		I.	Tr.	In.
	13	20		I.	Sh.	Eg.		3	20		I.	Oc.	Dis.		22	21		I.	Sh.	In.
	21	37		IV.	Oc.	Dis.		6	49	6.8	I.	Ec.	Re.		23	21		I.	Tr.	Eg.
	23	10		IV.	Oc.	Re.		11	46		II.*	Oc.	Dis.		28	0	36	I.	Sh.	Eg.
9	6	58		I.	Oc.	Dis.		14	22		II.	Oc.	Re.		3	9		III.	Oc.	Dis.
	10	25	32.3	I.*	Ec.	Re.		14	24	44.0	II.	Ec.	Dis.		6	3		III.	Oc.	Re.
	14	4		II.	Tr.	In.		16	39	28.1	II.	Ec.	Re.		8	32	21.8	III.*	Ec.	Dis.
	16	36		II.	Sh.	In.	19	0	41		I.	Tr.	In.		10	52	52.4	III.*	Ec.	Re.
	16	39		II.	Tr.	Eg.		1	57		I.	Sh.	In.		18	13		I.	Oc.	Dis.
	19	7		II.	Sh.	Eg.		2	57		I.	Tr.	Eg.		21	41	24.7	I.	Ec.	Re.
10	4	19		I.	Tr.	In.		4	12		I.	Sh.	Eg.	29	3	41		II.	Oc.	Dis.
	5	15		III.	Tr.	In.		21	49		I.	Oc.	Dis.		6	17		II.	Oc.	Re.
	5	34		I.	Sh.	In.	20	1	17	47.8	I.	Ec.	Re.		6	19	0.0	II.	Ec.	Dis.
	6	34		I.	Tr.	Eg.		5	54		II.	Tr.	In.		8	43	6.5	II.*	Ec.	Re.
	7	49		I.	Sh.	Eg.		8	30		II.*	Tr.	In.		15	34		I.	Tr.	In.
	8	8		III.*	Tr.	Eg.		8	31		II.*	Sh.	Eg.		16	50		I.	Sh.	In.
	10	26		III.*	Sh.	In.		11	0		II.*	Sh.	Eg.		17	50		I.	Tr.	Eg.
	13	1		III.	Sh.	Eg.		19	10		I.	Tr.	In.		19	5		I.	Sh.	Eg.
11	1	27		I.	Oc.	Dis.		20	26		I.	Sh.	In.		12	42		I.	Oc.	Dis.
	4	54	17.3	I.	Ec.	Re.		21	26		I.	Tr.	Eg.		16	10	5.6	I.	Ec.	Re.
	9	12		II.*	Oc.	Dis.		22	41		I.	Sh.	Eg.		21	50		II.	Tr.	In.

NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

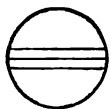
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

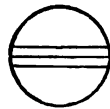
JUNE.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

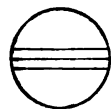
I.

r  
\*

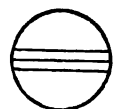
III.

d  
\*    r  
\*

II.

d  
\*    r  
\*

IV. No Eclipse.

*Configurations at 10<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.			East.		
1	○ 1'		4'	○	'2	3'
2		4'		○	2' '1	3'
3		4'	2' 1' 3'	○		
4	4'		3'	○	'2	'1
5	'4		'3	○		2'
6		'4	2' '3	○	1'	
7		'4	'2 '1	○		'3
8	○ 1'		'4	○	'2	'3
9				○	'1 2' '4	3'
10			2' 1' 3'	○		'4
11			3'	○	'1	'4 '2 ●
12			'3 1'	○	2'	'4
13			'3 2'	○	1.	4'
14			'2 '1	○	'3	4'
15				○	1' '2	'3 4'
16				○	2' 4' 3'	'1 ●
17	○ 3'		2' 1' 4'	○		
18			'4 '2	○	'1	
19		4' '3	1'	○		'2
20	4'		'3 2'	○	1'	
21	4'		'2 '1	○	'3	
22	'4			○	1' '2	'3
23		'4	'1	○	2'	3'
24	○ 1'		'4 2'	○	3'	
25			3' '2 '4	○	'1	
26		'3	1'	○	'4 '2	
27	○ 2'		'3	○	'1	'4
28			'2 '1	○	'3	'4
29				○	'21'	'3 '4
30			'1	○	2' 3'	4'

WASHINGTON MEAN TIME.

JULY.

d	h	m	s		d	h	m	s		d	h	m	s						
1	0	24		II.	11	13	50		II.	21	18	33		I.	Occ.	Dis.			
	0	26		II.		16	19		II.		21	54	50.3	I.	Ec.	Re.			
	2	54		II.		16	26		II.		5	53		II.	Tr.	In.			
10	3			I.*		18	48		II.		8	14		II.*	Sh.	In.			
11	19			I.	12	0	58		I.		8	29		II.*	Tr.	Eg.			
12	19			I.		2	11		I.		10	42		II.	Sh.	Eg.			
13	33			I.		3	14		I.		15	54		I.	Tr.	In.			
17	8			III.		4	26		I.		17	3		I.	Sh.	In.			
20	2			III.		9	45		IV.*		18	10		I.	Tr.	Eg.			
22	23			III.		11	20		III.		19	18		I.	Sh.	Eg.			
2	0	55		III.		11	32		IV.		23	5	35	III.	Tr.	In.			
7	11			I.		14	14		III.		8	28		III.*	Tr.	Eg.			
10	38	52.5		I.*		16	31	9.3	III.		10	22		III.	Sh.	In.			
17	1			II.		18	49	13.0	III.		12	50		III.	Sh.	Eg.			
19	37			II.		22	6		I.		13	3		I.	Occ.	Dis.			
19	37	15.6		II.	13	1	31	14.4	I.		16	23	37.7	I.	Ec.	Re.			
22	1	9.8		II.		9	0		II.*		24	1	3	II.	Occ.	Dis.			
8	4	32		I.		13	54	21.8	II.		5	47	25.5	II.	Ec.	Re.			
5	47			I.		19	27		I.		10	24		I.	Tr.	In.			
6	48			I.		20	40		I.		11	32		I.	Sh.	In.			
8	2			I.*		21	43		I.		12	40		I.	Tr.	Eg.			
22	40			IV.		22	54		I.		13	46		I.	Sh.	Eg.			
4	0	27		IV.	14	16	35		I.		25	7	32	I.	Occ.	Dis.			
1	40			I.		19	59	55.1	I.		10	52	19.5	I.	Ec.	Re.			
5	7	34.2		I.	15	3	10		II.		19	15		II.	Tr.	In.			
11	9			II.		5	37		II.		21	32		II.	Sh.	In.			
13	43			II.		5	47		II.		21	51		II.	Tr.	Eg.			
13	46			II.		8	6		II.*		26	0	0	II.	Sh.	Eg.			
16	12			II.		13	56		I.		4	53		I.	Tr.	In.			
23	1			I.		15	9		I.		6	1		I.	Sh.	In.			
5	0	16		I.		16	12		I.		7	9		I.	Tr.	Eg.			
1	17			I.		17	23		I.		8	15		I.*	Sh.	Eg.			
2	31			I.	16	1	23		III.		19	43		III.	Occ.	Dis.			
7	13			III.		4	17		III.		22	36		III.	Occ.	Re.			
10	7			III.*		6	23		III.		27	0	30	3.4	III.	Ec.	Dis.		
12	31	55.7		III.		8	52		III.*		2	2		I.	Occ.	Dis.			
14	51	13.1		III.		11	5		I.		2	45	39.0	III.	Ec.	Re.			
20	9			I.		14	28	42.2	I.		5	21	5.2	I.	Ec.	Re.			
23	36	19.3		I.		22	21		II.		14	24		II.	Occ.	Dis.			
6	6	20		II.	17	3	12	11.0	II.		19	4	54.0	II.	Ec.	Re.			
11	18	49.3		II.		8	26		I.*		23	23		I.	Tr.	In.			
17	30			I.		9	37		I.*		28	0	29	I.	Sh.	In.			
18	45			I.		10	41		I.		1	39		I.	Tr.	Eg.			
19	46			I.		11	52		I.		2	44		I.	Sh.	Eg.			
21	0			I.	18	5	34		I.		20	32		I.	Occ.	Dis.			
7	14	38		I.		8	57	23.6	I.*		23	49	44.2	I.	Ec.	Re.			
18	5			I.		16	32		II.		4	59		IV.	Occ.	Dis.			
8	0	29	0.1	II.		18	55		II.		6	39		IV.	Occ.	Re.			
3	1			II.		19	8		II.		8	37		II.*	Tr.	In.			
3	6			II.		21	24		II.		10	50		II.	Sh.	In.			
5	30			II.	19	2	55		I.		11	13		II.	Tr.	Eg.			
11	59			I.		4	6		I.		13	19		II.	Sh.	Eg.			
13	14			I.		5	11		I.		17	53		I.	Tr.	In.			
14	15			I.		6	20		I.		18	58		I.	Sh.	In.			
15	28			I.		15	30		III.		20	9		I.	Tr.	Eg.			
21	13			III.		18	23		III.		21	13		I.	Sh.	Eg.			
9	0	7		III.		20	30	24.2	III.		30	9	49	III.	Tr.	In.			
2	23			III.		22	47	13.8	III.		12	41		III.	Tr.	Eg.			
4	53			III.		20	0	4	III.		14	22		III.	Sh.	In.			
9	7			I.*	20	3	26	9.6	I.		15	2		I.	Occ.	Dis.			
12	33	47.4		I.		11	42		I.		16	49		III.	Sh.	Eg.			
19	40			II.		16	29	43.4	II.		18	18	32.2	I.	Ec.	Re.			
10	0	36	45.7	II.		17	32		IV.		31	3	46	II.	Occ.	Dis.			
6	28			I.		19	15		IV.		8	22	29.0	II.*	Ec.	Re.			
7	42			I.		21	25		I.		12	22		I.	Tr.	In.			
8	44			I.*		22	35		I.		13	27		I.	Sh.	In.			
9	57			I.*		23	41		I.		14	38		I.	Tr.	Eg.			
11	3	37		I.	21	0	49		I.		15	41		I.	Sh.	Eg.			
7	2	29.0		I.															

NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

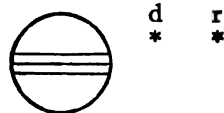
JULY.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.



III.



II.



IV. No Eclipse.

*Configurations at 9<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.	.	East.
1		2°	○ 1° 3° 4°
2		3° '2	○ 4° '1 ●
3	3°	1°	○ 4° '2
4	'3	4°	○ 2° '1
5	4° 2° 1°	○	'3 ●
6	4°	○	1° '3 '2 ●
7	4°	'1	○ 2° 3°
8	'4	2°	○ 1° 3°
9	'4	2° '1	○
10	'4 3°	1°	○ '2
11	'3 '4	○	1°
12	2° 1°	'3	○ '4 ●
13		○	'1 '4 '3 '2 ●
14		'1	○ 2° 3° '4
15		2°	○ 1° 3° '4
16		'2 3° '1	○ '4
17	○ 1° 3°	○	'2 4°
18	'3	○	'1 2° 4°
19	2°	1°	○ 4°
20		'2	○ 4° '1 '3
21		1° '4	○ '2 '3
22	○ 2° 4°	○	1° 3°
23	4°	'2 '1 3°	○
24	4° 3°	○	1° '2
25	'4 '3	○	2° '1 ●
26	'4	2° '3 1°	○
27	'4	'2	○ '1 '3
28		'4 1°	○ '2 '3
29	○ 2°	○	'4 1° 3°
30		'2 '1	○ 3° '4
31	3°	○	1° '4

## WASHINGTON MEAN TIME.

AUGUST.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s		
1	9	31		I.	11	6	33		I.	21	20	36		I.	21	20	36		I.	21	20	36		I.	
	12	47	14.2	I.		12	0	31				21	24				21	24				21	24		I.
	22	0		II.			3	39	31.3			16	31				16	31				18	31	47.3	I.
2	0	8		II.		14	9					6	21				6	21				6	21		II.
	0	36		II.		16	4					7	59				7	59				7	59		II.
	2	37		II.		16	45					8	56				8	56				8	56		II.
	6	52		I.		18	31					9	15				9	15				9	15		IV.
	7	55		I.*		21	51					10	15				10	15				10	15		IV.
	9	8		I.*		22	47					10	26				10	26				10	26		II.
	10	10		I.		18	0	7				12	51				12	51				12	51		I.
	23	59		III.		1	1					13	39				13	39				13	39		I.
3	2	51		III.		18	25					15	7				15	7				15	7		I.
	4	1		I.		19	1					15	53				15	53				15	53		I.
	4	29	36.6	III.		21	15					10	1				10	1				10	1		I.
	6	43	58.2	III.		22	8	17.8				13	0	32.0			13	0	32.0			13	0	32.0	I.
	7	15	59.3	I.		22	19					13	2				13	2				13	2		III.
	17	8		II.		14	0	44				15	49				15	49				15	49		III.
	21	39	52.8	II.		9	16					16	28	34.0			16	28	34.0			16	28	34.0	III.
4	1	22		I.		13	32	1.4				18	39	13.0			18	39	13.0			18	39	13.0	III.
	2	24		I.		16	21					1	25				1	25				1	25		II.
	3	38		I.		17	16					5	23	42.0			5	23	42.0			5	23	42.0	II.
	4	38		I.		18	36					7	21				7	21				7	21		I.*
	22	31		I.		19	30					8	8				8	8				8	8		I.
5	1	44	39.1	I.		15	0	52				9	37				9	37				9	37		I.
	11	23		II.		2	10					10	22				10	22				10	22		I.
	13	27		II.		13	31					4	31	9.5			4	31	9.5			4	31	9.5	I.*
	13	58		II.		16	36	58.3				7	29				7	29				7	29		II.
	15	55		II.		16	3	33				19	45				19	45				19	45		II.
	19	52		I.		5	22					21	17				21	17				21	17		II.
	20	53		I.		6	8					22	19				22	19				22	19		II.
	22	8		I.		7	49					23	44				23	44				23	44		II.
	23	7		I.		10	51					1	51				1	51				1	51		I.
6	13	5		IV.		11	45					2	36				2	36				2	36		I.
	14	6		III.		13	6					4	7				4	7				4	7		I.
	14	35		IV.		13	59					4	50				4	50				4	50		I.
	16	57		III.		17	8	1				23	1				23	1				23	1		I.
	17	1		I.		8	39					1	57	54.7			1	57	54.7			1	57	54.7	I.
	18	20		III.		11	5	43.3				3	9				3	9				3	9		III.
	20	13	26.0	III.		11	28					5	56				5	56				5	56		III.
	20	46		III.		12	29	10.6				6	17				6	17				6	17		III.
7	6	31		II.		14	41	3.6				8	40				8	40				8	40		III.
	10	57	20.5	II.		22	38					14	48				14	48				14	48		III.
	14	21		I.		2	49	16.3				18	40	50.3			18	40	50.3			18	40	50.3	II.
	15	21		I.		5	21					20	21				20	21				20	21		II.
	16	37		I.		6	13					21	5				21	5				21	5		I.
	17	36		I.		7	36					22	37				22	37				22	37		I.
8	11	31		I.		8	27					23	19				23	19				23	19		I.
	14	42	6.7	I.		19	2	31				17	32				17	32				17	32		I.
9	0	46		II.		5	34	21.8				20	26	33.7			20	26	33.7			20	26	33.7	I.
	2	45		II.		16	57					9	10				9	10				9	10		II.
	3	21		II.		18	40					10	36				10	36				10	36		II.
	5	13		II.		19	32					11	44				11	44				11	44		II.
	8	51		I.		21	8					13	2				13	2				13	2		II.
	9	50		I.		23	51					14	51				14	51				14	51		I.
	11	7		I.		20	0	42				15	33				15	33				15	33		I.
	12	4		I.		2	6					17	7				17	7				17	7		I.
10	4	19		III.		2	56					17	47				17	47				17	47		I.
	6	1		I.		21	1					12	2				12	2				12	2		I.
	7	9		III.		22	46					14	55	17.6			14	55	17.6			14	55	17.6	I.
	8	29	43.5	III.*		21	0	3	7.6			17	25				17	25				17	25		III.
	9	10	52.1	I.		1	34					20	11				20	11				20	11		III.
	10	42	50.7	III.		2	18					20	27	35.3			20	27	35.3			20	27	35.3	III.
	19	53		II.		4	42					21	27				21	27				21	27		IV.
11	0	14	40.6	II.		12	2					21	48				21	48				21	48		IV.
	3	21		I.		16	6	31.0				22	37	0.3			22	37	0.3			22	37	0.3	III.
	4	19		I.		18	21																		III.
	5	37		I.		19	10																		III.

NOTE.—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.



## WASHINGTON MEAN TIME.

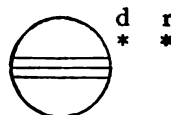
AUGUST.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

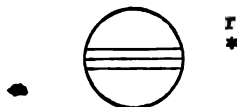
I.



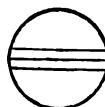
III.



II.



IV. No Eclipse.

*Configurations at 8<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.			East.		
1		'3	'1	○	2'	'4
2	○ 1'	'3	2'	○		'4
3		'2	○	'1	'3	4'
4			1'	○	'2	'3 4'
5			○	2'	'1	4' 3'
6		2'	'1	○	4' 3'	
7		3' 4'	○	1'		'2 ●
8		4' 3'	'1	○	2'	
9	4'	'3	2'	○	1'	
10	4'	'2	○	'3		'1 ●
11	'4		1'	○	'2	'3
12	'4		○	1' 3'	3'	
13	'4	2' 1'	○	3'		
14		4' 3'	'2	○	1'	
15	3'	'1	○	'4	2'	
16	'3	2'	○	1'	'4	
17		'2	3' 1' ○		'4	
18		1'	○	'2	'3	'4
19			○	'1	2'	3' 4'
20		2' 1'	○	3'		4'
21		3' 2'	○	'1		4'
22	3'	'1	○	'24'		
23	○ 2'	'3	○	4' 1'		
24		4' 3'	1' ○			
25	○ 1'	4'	○	'2	'3	
26	4'		○	'1	2'	'3
27	4'	2' 1'	○		3'	
28	'4	'2	3' ○	'1		
29	'4	3' 1'	○	'2		
30		4' 3'	○	2'	1'	
31		2' 3' 1'	○			

WASHINGTON MEAN TIME.

SEPTEMBER.

[illegible]

## THE SATELLITES OF JUPITER

ARE NOT VISIBLE FROM SEPTEMBER 13 UNTIL NOVEMBER 12.

### JUPITER BEING TOO NEAR TO THE SUN.

**NOTE.**—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

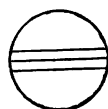
## SEPTEMBER

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.



III.



II.



IV. No Eclipse.

*Configurations at 7<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.	East.
1		○ 2 1' 4' 3
2		○ 2' 4' 3 1 ●
3	2' 1' ○	3' 4'
4	2' ○ 3' 1'	4'
5	3' 1' ○	2' 4'
6	3' ○	2' 1' 4'
7	2' 3' 1' ○	4'
8		○ 1' 4' 2 ●
9	○ 4' 1' ○	2' 3'
10	○ 1' 4' 2' ○	3'
11	4' 2' ○	1' 3'
12	4' 3' 1' ○	2'

WASHINGTON MEAN TIME.

NOVEMBER.

d	h	m	s		d	h	m	s		d	h	m	s		d	h	m	s	
12	2	18	26.0	I.	Ec.	Dis.	18	16	16	17.5	III.	Ec.	Dis.	25	11	0	I.	Sh.	Eg.
	4	59		I.	Oc.	Re.		18	12	27.1	III.*	Ec.	Ra.		11	41	I.	Tr.	Eg.
	23	28		I.	Sh.	In.		18	31		III.	Oc.	Dis.		12	21	II.	Ec.	Dis.
	23	58		I.	Tr.	In.		20	45		III.	Oc.	Re.		16	5	II.	Oc.	Re.
13	1	42		I.	Sh.	Eg.	19	4	12	22.6	I.	Ec.	Dis.		20	14	III.	Ec.	Dis.
	2	0		II.	Sh.	In.		7	0		I.	Oc.	Re.		22	9	III.	Ec.	Re.
	2	13		I.	Tr.	Eg.	20	1	22		I.	Sh.	In.		22	57	III.	Oc.	Dis.
	2	59		II.	Tr.	In.		1	58		I.	Tr.	In.		1	6	III.	Oc.	Re.
	4	44		II.	Sh.	Eg.		3	35		I.	Sh.	Eg.	26	6	6	I.	Ec.	Dis.
	5	25		II.	Tr.	Eg.		4	12		I.	Tr.	Eg.		9	0	I.	Oc.	Re.
	20	46	58.5	I.	Ec.	Dis.		4	36		II.	Sh.	In.	27	3	15	I.	Sh.	In.
	23	29		I.	Oc.	Re.		5	49		II.	Tr.	In.		3	58	I.	Tr.	In.
14	17	57		I.*	Sh.	In.		7	0		II.	Sh.	Eg.		5	28	I.	Sh.	Eg.
	18	28		I.	Tr.	In.		8	14		II.	Tr.	Eg.		6	11	I.	Tr.	Eg.
	20	10		I.	Sh.	Eg.		22	40	53.7	I.	Ec.	Dis.		7	12	II.	Sh.	In.
	20	31	28.0	II.	Ec.	Dis.	21	1	30		I.	Oc.	Re.		8	37	II.	Tr.	In.
	20	43		I.	Tr.	Eg.		19	50		I.	Sh.	In.		9	36	II.	Sh.	Eg.
	23	57		II.	Oc.	Re.		20	28		I.	Tr.	In.		11	1	II.	Tr.	Eg.
15	2	1		III.	Sh.	In.		22	3		I.	Sh.	Eg.	28	0	34	I.	Ec.	Dis.
	4	8		III.	Tr.	In.		22	41		I.	Tr.	Eg.		3	30	I.	Oc.	Re.
	4	11		III.	Sh.	Eg.		23	4	42.7	II.	Ec.	Dis.		21	43	I.	Sh.	In.
	6	24		III.	Tr.	Eg.	22	2	42		II.	Oc.	Re.		22	27	I.	Tr.	In.
	15	15	25.6	I.	Ec.	Dis.		5	58		III.	Sh.	In.		23	56	I.	Sh.	Eg.
	17	59		I.*	Oc.	Re.		8	8		III.	Sh.	Eg.	29	0	41	I.	Tr.	Eg.
16	12	25		I.	Sh.	In.		8	34		III.	Tr.	In.		1	37	II.	Ec.	Dis.
	12	58		I.	Tr.	In.		10	45		III.	Tr.	Eg.		5	27	II.	Oc.	Re.
	14	38		I.	Sh.	Eg.		17	9	19.5	I.	Ec.	Dis.		9	57	III.	Sh.	In.
	15	12		I.	Tr.	Eg.		20	0		I.	Oc.	Re.		12	5	III.	Sh.	Eg.
	15	18		II.	Sh.	In.	23	14	18		I.	Sh.	In.		12	58	III.	Tr.	In.
	16	24		II.	Tr.	In.		14	58		I.	Tr.	In.		15	6	III.	Tr.	Eg.
	17	42		II.*	Sh.	Eg.		16	32		I.	Sh.	Eg.		19	3	I.	Ec.	Dis.
	18	50		II.	Tr.	Eg.		17	11		I.*	Tr.	Eg.		21	59	I.	Oc.	Re.
17	9	43	58.2	I.	Ec.	Dis.		17	54		II.*	Sh.	In.	30	16	11	I.	Sh.	In.
	12	30		I.	Oc.	Re.		19	13		II.	Tr.	In.		16	57	I.*	Tr.	In.
18	6	53		I.	Sh.	In.		20	18		II.	Sh.	Eg.		18	25	I.*	Sh.	Eg.
	7	28		I.	Tr.	In.		21	38		II.	Tr.	Eg.		19	11	I.	Tr.	Eg.
	9	7		I.	Sh.	Eg.	24	11	37	50.6	I.	Ec.	Dis.		20	30	II.	Sh.	In.
	9	42		I.	Tr.	Eg.		14	30		I.	Oc.	Re.		22	1	II.	Tr.	In.
	9	48	4.6	II.	Ec.	Dis.	25	8	47		I.	Sh.	In.		22	54	II.	Sh.	Eg.
	13	20		II.	Oc.	Re.		9	28		I.	Tr.	In.						

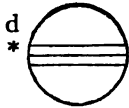
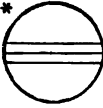
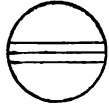
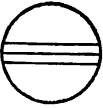
**NOTE.**—In., denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

Occ., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

WASHINGTON MEAN TIME.

NOVEMBER.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.*

I.		III.	
II.		IV. No Eclipse.	

*Configurations at 17<sup>h</sup> 30<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
12				○	1' 2'	'3		4'
13		2'	'1	○		3'	4'	
14			'2	○	1'	3'	4'	
15	○ 4'		3'	○		'2		'1 ●
16	○ 2'	3'	4'	1'	○			
17		4'	'3	'2	○	'1		
18	4'		1'	'3	○	'2		
19	4'				○	1' 2'	'3	
20	'4		2'	'1	○		3'	
21		'4		'2	○	1'	3'	
22			'4	3'	'1	○	'2	
23		3'		'4	1' ○	2'		
24		'3	2'		○	'1	'4	
25			1' '3	○	'2		'4	
26				○	'1	'3	'4	
27			'1	○		'3	'4	
28			'2	○	1'	3'		4'
29				'1	○	'2		4'
30	○ 1'	3'		○	2'		4'	

## WASHINGTON MEAN TIME.

## DECEMBER.

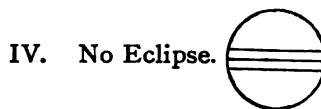
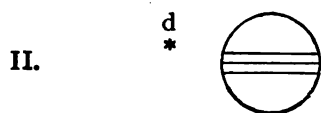
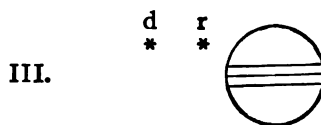
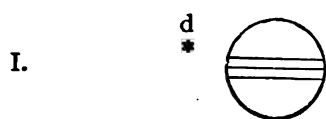
d	h	m	s				d	h	m	s				d	h	m	s				
1	0	25		II.	Tr.	Eg.	11	14	12		II.	Tr.	In.	22	1	5		I.	Tr.	Eg.	
13	31	37.5		I.	Ec.	Dis.	14	47			II.	Sh.	Eg.		4	17		II.	Sh.	In.	
16	29			I.*	Oc.	Re.	16	34			II.*	Tr.	Eg.		6	19		II.	Tr.	In.	
2	10	40		I.	Sh.	In.	12	4	22	6.4	I.	Ec.	Dis.		6	39		II.	Sh.	Eg.	
11	27			I.	Tr.	In.	7	28			I.	Oc.	Re.		8	41		II.	Tr.	Eg.	
12	53			I.	Sh.	Eg.	13	1	30		I.	Sh.	In.		19	12	26.6	I.	Ec.	Dis.	
13	40			I.	Tr.	Eg.	2	25			I.	Tr.	In.		22	25		I.	Oc.	Re.	
14	54	33.3		II.	Ec.	Dis.	3	43			I.	Sh.	Eg.		23	16	19	I.*	Sh.	In.	
18	49			II.	Oc.	Re.	4	38			I.	Tr.	Eg.		17	22		I.*	Tr.	In.	
8	0	12	50.1	III.	Ec.	Dis.	6	44	26.1		II.	Ec.	Dis.		18	32		I.*	Sh.	Eg.	
2	6	41.5		III.	Ec.	Re.	10	54			II.	Oc.	Re.		19	34		I.	Tr.	Eg.	
3	21			III.	Oc.	Dis.	17	53			III.*	Sh.	In.		22	34	25.0	II.	Ec.	Dis.	
5	26			III.	Oc.	Re.	19	59			III.	Sh.	Eg.		24	2	58	II.	Oc.	Re.	
7	59	59.3		I.	Ec.	Dis.	21	42			III.	Tr.	In.		12	6	44.3	III.	Ec.	Dis.	
10	59			I.	Oc.	Re.	22	50	28.1		I.	Ec.	Dis.		13	40	45.0	I.	Ec.	Dis.	
4	5	8		I.	Sh.	In.	23	42			III.	Tr.	Eg.		13	57	11.5	III.	Ec.	Re.	
5	57			I.	Tr.	In.	14	1	57		I.	Oc.	Re.		16	20		III.*	Oc.	Dis.	
7	21			I.	Sh.	Eg.	19	58			I.	Sh.	In.		16	54		I.*	Oc.	Re.	
8	10			I.	Tr.	Eg.	20	55			I.	Tr.	In.		18	13		III.*	Oc.	Re.	
9	48			II.	Sh.	In.	22	11			I.	Sh.	Eg.		25	10	48	I.	Sh.	In.	
11	25			II.	Tr.	In.	23	7			I.	Tr.	Eg.		11	51		I.	Tr.	In.	
12	11			II.	Sh.	Eg.	15	1	41		II.	Sh.	In.		13	1		I.	Sh.	Eg.	
13	48			II.	Tr.	Eg.	3	35			II.	Tr.	In.		14	3		I.	Tr.	Eg.	
5	2	28	27.5	I.	Ec.	Dis.	4	4			II.	Sh.	Eg.		17	34		II.*	Sh.	In.	
5	29			I.	Oc.	Re.	5	56			II.	Tr.	Eg.		19	41		II.	Tr.	In.	
23	36			I.	Sh.	In.	17	18	55.3		I.*	Ec.	Dis.		19	57		II.	Sh.	Eg.	
6	0	27		I.	Tr.	In.	20	27			I.	Oc.	Re.		22	2		II.	Tr.	Eg.	
1	50			I.	Sh.	Eg.	16	14	26		I.	Sh.	In.		26	8	9	9.0	I.	Ec.	Dis.
2	40			I.	Tr.	Eg.	15	24			I.	Tr.	In.		11	23		I.	Oc.	Re.	
4	11	11.0		II.	Ec.	Dis.	16	39			I.*	Sh.	Eg.		27	5	16	I.	Sh.	In.	
8	11			II.	Oc.	Re.	17	37			I.*	Tr.	Eg.		6	20		I.	Tr.	In.	
13	54			III.	Sh.	In.	20	1	5.4		II.	Ec.	Dis.		7	29		I.	Sh.	Eg.	
16	2			III.*	Sh.	Eg.	17	0	15		II.	Oc.	Re.		8	33		I.	Tr.	Eg.	
17	21			III.*	Tr.	In.	8	8	30.7		III.	Ec.	Dis.		11	51	4.0	II.	Ec.	Dis.	
19	24			III.	Tr.	Eg.	10	0	5.3		III.	Ec.	Re.		16	18		II.*	Oc.	Re.	
20	56	50.6		I.	Ec.	Dis.	11	47	15.0		I.	Ec.	Dis.		28	1	49	III.	Sh.	In.	
23	59			I.	Oc.	Re.	12	2			III.	Oc.	Dis.		2	37	28.4	I.	Ec.	Dis.	
7	18	5		I.*	Sh.	In.	13	59			III.	Oc.	Re.		3	53		III.	Sh.	Eg.	
18	56			I.	Tr.	In.	14	56			I.	Oc.	Re.		5	53		I.	Oc.	Re.	
20	18			I.	Sh.	Eg.	18	8	54		I.	Sh.	In.		6	17		III.	Tr.	In.	
21	9			I.	Tr.	Eg.	9	54			I.	Tr.	In.		8	8		III.	Tr.	Eg.	
23	6			II.	Sh.	In.	11	7			I.	Sh.	Eg.		23	44		I.	Sh.	In.	
8	0	48		II.	Tr.	In.	12	6			I.	Tr.	Eg.		0	50		I.	Tr.	In.	
1	29			II.	Sh.	Eg.	14	59			II.	Sh.	In.		1	57		I.	Sh.	Eg.	
3	11			II.	Tr.	Eg.	16	57			II.*	Tr.	In.		3	2		I.	Tr.	Eg.	
15	25	19.1		I.	Ec.	Dis.	17	22			II.*	Sh.	Eg.		6	51		II.	Sh.	In.	
18	28			I.*	Oc.	Re.	19	19			II.	Tr.	Eg.		9	3		II.	Tr.	In.	
9	12	33		I.	Sh.	In.	19	6	15	40.1	I.	Ec.	Dis.		9	14		II.	Sh.	Eg.	
13	26			I.	Tr.	In.	9	26			I.	Oc.	Re.		11	24		II.	Tr.	Eg.	
14	46			I.	Sh.	Eg.	20	3	23		I.	Sh.	In.		21	5	53.0	I.	Ec.	Dis.	
15	39			I.	Tr.	Eg.	4	23			I.	Tr.	In.		30	0	22	I.	Oc.	Re.	
17	27	48.5		II.*	Ec.	Dis.	5	36			I.	Sh.	Eg.		18	12		I.*	Sh.	In.	
21	33			II.	Oc.	Re.	6	36			I.	Tr.	Eg.		19	19		I.	Tr.	In.	
10	4	10	40.6	III.	Ec.	Dis.	9	17	43.4		II.	Ec.	Dis.		20	25		I.	Sh.	Eg.	
6	3	23.8		III.	Ec.	Re.	13	37			II.	Oc.	Re.		21	31		I.	Tr.	Eg.	
7	42			III.	Oc.	Dis.	21	51			III.	Sh.	In.		31	1	7	48.6	II.	Ec.	Dis.
9	44			III.	Oc.	Re.	23	56			III.	Sh.	Eg.		5	39		II.	Oc.	Re.	
9	53	39.7		I.	Ec.	Dis.	21	0	44	0.6	I.	Ec.	Dis.		15	34	10.5	I.*	Ec.	Dis.	
12	58			I.	Oc.	Re.	2	1			III.	Tr.	In.		16	4	44.8	III.*	Ec.	Dis.	
11	7	1		I.	Sh.	In.	3	56			III.	Tr.	Eg.		17	54	5.8	III.*	Ec.	Re.	
7	55			I.	Tr.	In.	3	55			I.	Oc.	Re.		18	51		I.*	Oc.	Re.	
9	14			I.	Sh.	Eg.	21	51			I.	Sh.	In.		20	34		III.	Oc.	Dis.	
10	8			I.	Tr.	Eg.	22	52			I.	Tr.	In.		22	23		III.	Oc.	Re.	
12	24			II.	Sh.	In.	22	0	4		I.	Sh.	Eg.								

NOTE.—In. denotes ingress; Eg., egress; Dis., disappearance; Re., reappearance; Ec., eclipse.

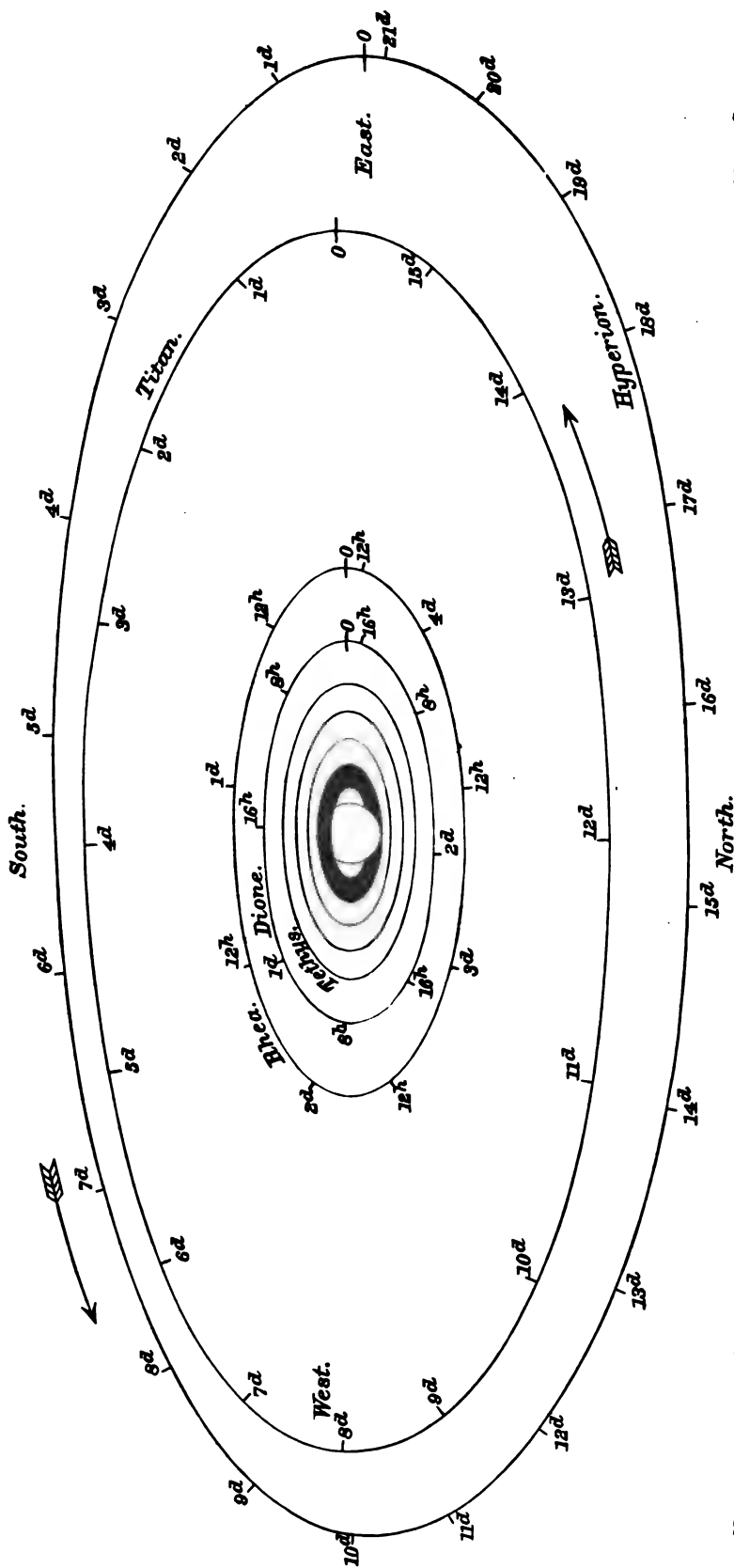
Oc., denotes occultation; Tr., transit of the satellite; Sh., transit of the shadow; \* Visible at Washington.

## WASHINGTON MEAN TIME.

DECEMBER.

*Phases of the Eclipses of the Satellites for an Inverting Telescope.**Configurations at 17<sup>h</sup> 00<sup>m</sup> for an Inverting Telescope.*

Day.	West.				East.			
1		'3	2'	○	'1	4'		
2			'3	1' 4'	○			'2 ●
3			4'	○	'1	'3	2'	
4		4'		1' 2'	○		'3	
5	4'		'2	○	1'		3'	
6	○ 3' 4'		'1	○	'2			
7	'4		3'	○	1' 2'			
8		'4	'3	2'	○			'1 ●
9		'4	'3	1' 2'	○			
10			'4	○	1' 2'			
11			1' 2'	○	'4		'3	
12			'2	○	1'		'4	3'
13			'1	○	3' 2'			'4
14			3'	○	1' 2'			'4
15		3'	2'	'1 ○				4'
16	○ 1'		'3	'2 ○			4'	
17				○	1' 2'	4'		
18	○ 2'			1' ○	4'	'3		
19			'2	4' ○	'1	3'		
20		4'	'1	○	'2	3'		
21		4'		3' ○	1' 2'			
22		4'	3'	2' '1 ○				
23	'4		'3	'2 ○	1'			
24	'4			○	'1	'2		'3 ●
25		'4		1' ○	2'	'3		
26		'4		1' 2' ○	'1	3'		
27			1' 4' ○	'2	3'			
28			3' ○	1' 2' 3'				
29		3'		1' 2' ○			'4	
30		'3	'2	○	1'			'4
31			'3	○	'2			'4 1' ●



NAMES OF THE

SATELLITES.

- I. Mimas.
- II. Enceladus.
- III. Tethys.
- IV. Dione.
- V. Rhea.
- VI. Titan.
- VII. Hyperion.
- VIII. Iapetus.

MEAN SYNODIC

PERIODS.

	d	h
I.	0	22.6
II.	1	8.9
III.	1	21.3
IV.	2	17.7
V.	4	12.5
VI.	15	23.3
VII.	21	7.6
VIII.	79	22.1

APPARENT ORBITS OF THE SEVEN INNER SATELLITES OF SATURN,

AT OPPOSITION IN 1898.

AS SEEN IN AN INVERTING TELESCOPE.



## WASHINGTON MEAN TIME OF GREATEST ELONGATION, ETC.

In the diagram on the preceding page, the points of the orbits marked "o" are those of the eastern elongation, as seen in an inverting telescope. The apparent position of a satellite at any time may be marked on the diagram by counting around the orbit the interval in days and hours which has elapsed since the last east elongation. The times of these elongations may be found from the following tables. Mimas can be seen only within a few hours of each elongation: the time of every elongation visible at Washington is therefore given. The times of other elongations of any satellite in the same direction may be found by adding or subtracting any multiple of the period. For the three outer satellites the times of elongation and conjunction are given. The following abbreviations are used:—

E., East Elongation,  
I., Inferior Conjunction (south of planet),  
W., West Elongation,  
S., Superior Conjunction (north of planet).

## MIMAS.

*Greatest Elongations Visible at Washington.*

Feb. 26 18.0 E. 27 16.6 E. 28 15.2 E. Mar. 1 13.9 E. 6 18.3 W.  7 16.9 W. 8 15.5 W. 9 14.1 W. 15 17.1 E. 16 15.7 E.  17 14.4 E. 18 13.0 E. 23 17.4 W. 24 16.0 W. 25 14.6 W.  26 13.2 W. 27 11.8 W. 31 17.6 E. Apr. 1 16.2 E. 2 14.8 E.	Apr. 3 13.4 E. 4 12.1 E. 9 16.4 W. 10 15.1 W. 11 13.7 W.  12 12.3 W. 13 10.9 W. 17 16.7 E. 18 15.3 E. 19 13.9 E.  20 12.5 E. 21 11.1 E. 25 16.9 W. 26 15.5 W. 27 14.1 W.  28 12.7 W. 29 11.3 W. 30 9.9 W. May 4 15.7 E. 5 14.3 E.	May 6 12.9 E. 7 11.6 E. 8 10.2 E. 12 15.9 W. 13 14.6 W.  14 13.2 W. 15 11.8 W. 16 10.4 W. 17 9.0 W. 18 7.6 W.  20 16.2 E. 21 14.8 E. 22 13.4 E. 23 12.0 E. 24 10.6 E.  25 9.2 E. 26 7.8 E. 28 16.4 W. 29 15.0 W. 30 13.6 W.	May 31 12.2 W. June 1 10.8 W. 2 9.4 W. 3 8.1 W. 6 15.2 E.  7 13.8 E. 8 12.4 E. 9 11.0 E. 10 9.7 E. 11 8.3 E.  15 14.0 W. 16 12.6 W. 17 11.3 W. 18 9.9 W. 19 8.5 W.  23 14.2 E. 24 12.9 E. 25 11.5 E. 26 10.1 E. 27 8.7 E.	July 1 14.5 W. 2 13.1 W. 3 11.7 W. 4 10.3 W. 5 9.0 W.  10 13.4 E. 11 12.0 E. 12 10.6 E. 13 9.2 E. 14 7.8 E.  19 12.2 W. 20 10.8 W. 21 9.4 W. 22 8.1 W. 27 12.5 E.  28 11.1 E. 29 9.7 E. 30 8.3 E. Aug. 5 11.4 W. 6 10.0 W.	Aug. 7 8.6 W. 8 7.2 W. 13 11.6 E. 14 10.3 E. 15 8.9 E.  16 7.5 E. 22 10.5 W. 23 9.1 W. 24 7.8 W. 31 9.5 E.  Sept. 1 8.1 E. 2 6.7 E. 8 9.8 W. 9 8.4 W. 10 7.0 W.  17 8.7 E. 18 7.3 E. 25 9.0 W. 26 7.6 W. 27 6.2 W.
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## ENCELADUS.

Feb. 23 21.8 E. 25 6.7 E. 26 15.6 E. 28 0.4 E. Mar. 1 9.3 E.  2 18.2 E. 4 3.1 E. 5 12.0 E. 6 20.9 E. 8 5.8 E.	Mar. 9 14.6 E. 10 23.5 E. 12 8.4 E. 13 17.3 E. 15 2.2 E.  16 11.1 E. 17 19.9 E. 19 4.8 E. 20 13.7 E. 21 22.6 E.	Mar. 23 7.5 E. 24 16.4 E. 26 1.2 E. 27 10.1 E. 28 19.0 E.  30 3.9 E. 31 12.7 E. Apr. 1 21.6 E. 3 6.5 E. 4 15.4 E.	Apr. 6 0.3 E. 7 9.2 E. 8 18.1 E. 10 2.9 E. 11 11.8 E.  12 20.7 E. 14 5.5 E. 15 14.4 E. 16 23.3 E. 18 8.2 E.	Apr. 19 17.0 E. 21 1.9 E. 22 10.8 E. 23 19.7 E. 25 4.6 E.  26 13.4 E. 27 22.3 E. 29 7.2 E. 30 16.1 E. May 2 1.0 E.	May 3 9.8 E. 4 18.7 E. 6 3.6 E. 7 12.4 E. 8 21.3 E.  10 6.2 E. 11 15.1 E. 12 23.9 E. 14 8.8 E. 15 17.7 E.
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## SATELLITES OF SATURN, 1898.

## WASHINGTON MEAN TIME OF GREATEST ELONGATION.

## ENCELADUS—(Concluded.)

May 17 2.6 E. 18 11.4 E. 19 20.3 E. 21 5.2 E. 22 14.1 E.	June 6 15.7 E. 8 0.6 E. 9 9.5 E. 10 18.4 E. 12 3.2 E.	June 27 4.9 E. 28 13.8 E. 29 22.6 E. July 1 7.5 E. 2 16.4 E.	July 17 18.1 E. 19 3.0 E. 20 11.8 E. 21 20.7 E. 23 5.6 E.	Aug. 7 7.4 E. 8 16.3 E. 10 1.2 E. 11 10.0 E. 12 18.9 E.	Aug. 27 20.7 E. 29 5.6 E. 30 14.5 E. 31 23.4 E. Sept. 2 8.3 E.
23 23.0 E. 25 7.8 E. 26 16.7 E. 28 1.6 E. 29 10.4 E.	13 12.1 E. 14 21.0 E. 16 5.9 E. 17 14.7 E. 18 23.6 E.	4 1.3 E. 5 10.1 E. 6 19.0 E. 8 3.9 E. 9 12.8 E.	24 14.5 E. 25 23.4 E. 27 8.3 E. 28 17.2 E. 30 2.0 E.	14 3.8 E. 15 12.7 E. 16 21.6 E. 18 6.5 E. 19 15.4 E.	3 17.2 E. 5 2.1 E. 6 11.0 E. 7 19.9 E. 9 4.8 E.
June 30 19.3 E. 1 4.2 E. 2 13.1 E. 3 22.0 E. 5 6.8 E.	20 8.5 E. 21 17.4 E. 23 2.2 E. 24 11.1 E. 25 20.0 E.	10 21.7 E. 12 6.6 E. 13 15.4 E. 15 0.3 E. 16 9.2 E.	Aug. 31 10.9 E. 1 19.8 E. 3 4.7 E. 4 13.6 E. 5 22.5 E.	21 0.3 E. 22 9.2 E. 23 18.0 E. 25 2.9 E. 26 11.8 E.	10 13.7 E. 11 22.6 E. 13 7.5 E. 14 16.4 E. 16 1.3 E.

## TETHYS.

Feb. 22 21.8 E. 24 19.1 E. 26 16.4 E. 28 13.7 E. Mar. 2 11.0 E.	Mar. 30 18.6 E. Apr. 1 15.9 E. 3 13.2 E. 5 10.5 E. 7 7.8 E.	May 5 15.1 E. 7 12.4 E. 9 9.7 E. 11 7.0 E. 13 4.3 E.	June 10 11.6 E. 12 8.9 E. 14 6.2 E. 16 3.5 E. 18 0.8 E.	July 16 8.2 E. 18 5.5 E. 20 2.8 E. 22 0.1 E. 23 21.4 E.	Aug. 21 5.1 E. 23 2.4 E. 24 23.8 E. 26 21.1 E. 28 18.4 E.
4 8.3 E. 6 5.6 E. 8 2.9 E. 10 0.2 E. 11 21.5 E.	9 5.1 E. 11 2.4 E. 12 23.6 E. 14 20.9 E. 16 18.2 E.	15 1.6 E. 16 22.9 E. 18 20.2 E. 20 17.5 E. 22 14.7 E.	19 22.1 E. 21 19.4 E. 23 16.7 E. 25 14.0 E. 27 11.3 E.	25 18.7 E. 27 16.1 E. 29 13.4 E. 31 10.7 E. Aug. 2 8.0 E.	Sept. 30 15.7 E. 1 13.0 E. 3 10.4 E. 5 7.7 E. 7 5.0 E.
13 18.8 E. 15 16.1 E. 17 13.4 E. 19 10.8 E. 21 8.1 E.	18 15.5 E. 20 12.8 E. 22 10.1 E. 24 7.4 E. 26 4.7 E.	24 12.0 E. 26 9.3 E. 28 6.6 E. 30 3.9 E. June 1 1.2 E.	July 29 8.6 E. 1 5.9 E. 3 3.2 E. 5 0.5 E. 6 21.8 E.	4 5.3 E. 6 2.6 E. 7 23.9 E. 9 21.2 E. 11 18.5 E.	9 2.4 E. 10 23.7 E. 12 21.0 E. 14 18.3 E. 16 15.6 E.
23 5.4 E. 25 2.7 E. 27 0.0 E. 28 21.3 E.	28 2.0 E. 29 23.3 E. May 1 20.6 E. 3 17.8 E.	2 22.5 E. 4 19.8 E. 6 17.1 E. 8 14.4 E.	8 19.0 E. 10 16.3 E. 12 13.6 E. 14 10.9 E.	13 15.8 E. 15 13.2 E. 17 10.5 E. 19 7.8 E.	18 13.0 E. 20 10.3 E. 22 7.6 E. 24 5.0 E.

## DIONE.

Feb. 23 23.0 E. 26 16.7 E. Mar. 1 10.4 E. 4 4.1 E. 6 21.8 E.	Mar. 28 19.3 E. 31 12.9 E. Apr. 3 6.6 E. 6 0.3 E. 8 17.9 E.	Apr. 30 15.2 E. May 3 8.8 E. 6 2.5 E. 8 20.1 E. 11 13.8 E.	June 2 11.0 E. 5 4.6 E. 7 22.3 E. 10 15.9 E. 13 9.6 E.	July 5 6.8 E. 8 0.5 E. 10 18.1 E. 13 11.8 E. 16 5.5 E.	Aug. 7 2.9 E. 9 20.6 E. 12 14.3 E. 15 8.0 E. 18 1.7 E.
9 15.5 E. 12 9.2 E. 15 2.8 E. 17 20.5 E. 20 14.2 E.	11 11.6 E. 14 5.2 E. 16 22.9 E. 19 16.6 E. 22 10.2 E.	14 7.4 E. 17 1.1 E. 19 18.7 E. 22 12.4 E. 25 6.0 E.	16 3.2 E. 18 20.8 E. 21 14.5 E. 24 8.2 E. 27 1.8 E.	18 23.1 E. 21 16.8 E. 24 10.5 E. 27 4.2 E. 29 21.9 E.	20 19.4 E. 23 13.1 E. 26 6.8 E. 29 0.5 E. 31 18.2 E.
23 7.9 E. 26 1.6 E.	25 3.9 E. 27 21.5 E.	27 23.7 E. 30 17.3 E.	July 29 19.5 E. 2 13.1 E.	Aug. 1 15.6 E. 4 9.2 E.	Sept. 3 12.0 E. 6 5.7 E.

RHEA.		TITAN.		HYPERION.		IAPETUS.
d h	d h	d h	d h	d	d	d
Feb. 28 17.8 E.	June 8 1.7 E.	Mar. 12 7 W.	June 7 16 E.	Feb. 21.5 S.	June 19.1 I.	Feb. 26.5 S.
Mar. 5 6.3 E.	12 14.1 E.	16 7 S.	11 15 I.	27.4 E.	23.9 W.	Mar. 17.9 E.
9 18.7 E.	17 2.4 E.	20 3 E.	15 18 W.	Mar. 4.9 I.	29.2 S.	Apr. 5.9 I.
14 7.1 E.	21 14.7 E.	24 2 I.	19 17 S.	9.6 W.	July 5.0 E.	26.1 W.
18 19.5 E.	26 3.0 E.	28 5 W.	23 14 E.	14.9 S.	10.4 I.	May 16.5 S.
23 8.0 E.	30 15.4 E.	Apr. 1 6 S.	27 13 I.	20.7 E.	15.2 W.	June 4.3 E.
27 20.4 E.	July 5 3.8 E.	5 2 E.	July 1 15 W.	26.1 I.	20.5 S.	23.0 I.
Apr. 1 8.8 E.	9 16.1 E.	9 1 I.	5 15 S.	30.9 W.	26.4 E.	July 13.2 W.
5 21.1 E.	14 4.5 E.	13 4 W.	9 11 E.	Apr. 5.2 S.	31.7 I.	Aug. 2.7 S.
10 9.5 E.	18 16.8 E.	17 3 S.	13 11 I.	11.0 E.	Aug. 5.6 W.	22.0 E.
14 21.8 E.	23 5.2 E.	20 24 E.	17 13 W.	16.4 I.	10.9 S.	Sept. 10.2 I.
19 10.2 E.	27 17.6 E.	24 23 I.	21 13 S.	21.1 W.	16.8 E.	Oct. 1.0 W.
23 22.5 E.	Aug. 1 6.0 E.	29 2 W.	25 9 E.	26.4 S.	22.1 I.	
28 10.9 E.	5 18.5 E.	May 3 1 S.	29 9 I.	May 2.2 E.	27.0 W.	
May 2 23.2 E.	10 6.9 E.	6 21 E.	Aug. 2 12 W.	7.6 I.	Sept. 1.3 S.	
7 11.5 E.	14 19.4 E.	10 20 I.	6 11 S.	12.4 W.	7.2 E.	
11 23.9 E.	19 7.8 E.	14 23 W.	10 8 E.	17.7 S.	12.6 I.	
16 12.2 E.	23 20.3 E.	18 23 S.	14 8 I.	23.5 E.	17.5 W.	
21 0.5 E.	28 8.7 E.	22 19 E.	18 11 W.	28.8 I.	22.8 S.	
25 12.8 E.	Sept. 1 21.2 E.	26 18 I.	22 10 S.	June 2.6 W.	28.7 E.	
30 1.1 E.	6 9.7 E.	30 20 W.	26 7 E.	7.9 S.	Oct. 4.0 I.	
June 3 13.4 E.	10 22.2 E.	June 3 20 S.	30 7 I.	13.7 E.	8.9 W.	

## THE APPARENT ELEMENTS OF SATURN'S RINGS.

Greenwich Mean Noon.	<i>a</i>	<i>b</i>	<i>p</i>	<i>l</i>	<i>l'</i>	<i>u</i> <i>u'</i>	
	Outer Major Axis.	Outer Minor Axis.	Inclination of Northern Semi-Minor Axis to Circle of Declination from North to East.	The Elevation of the Earth above the Plane of the Ring.	The Elevation of the Sun above the Plane of the Ring.	Earth's Longitude from Saturn counted on Plane of Ring from the Ring's Ascending Node on the—	
						Equator.	Ecliptic.
Jan. 0	34.68	15.17	+ 3 44.9	+ 25 55.7	+ 25 26.9	300 25.9	258 6.4
20	35.41	15.57	+ 3 59.6	+ 26 4.8	+ 25 32.4	302 36.2	260 16.6
Feb. 9	36.40	16.05	+ 4 11.0	+ 26 9.6	+ 25 37.7	304 18.3	261 58.9
Mar. 1	37.59	16.59	+ 4 18.1	+ 26 10.8	+ 25 42.8	305 23.8	263 4.4
21	38.87	17.13	+ 4 20.5	+ 26 9.3	+ 25 47.8	305 46.5	263 27.2
Apr. 10	40.08	17.63	+ 4 18.1	+ 26 6.0	+ 25 52.5	305 25.0	263 5.8
30	41.04	18.00	+ 4 11.4	+ 26 1.1	+ 25 57.1	304 24.2	262 5.1
May 20	41.57	18.17	+ 4 1.6	+ 25 55.2	+ 26 1.5	302 56.1	260 37.1
June 9	41.57	18.10	+ 3 50.6	+ 25 49.0	+ 26 5.7	301 18.3	258 59.3
29	41.04	17.82	+ 3 40.5	+ 25 44.0	+ 26 9.6	299 50.1	257 31.2
July 19	40.10	17.39	+ 3 33.4	+ 25 41.9	+ 26 13.4	298 48.4	256 29.7
Aug. 8	38.90	16.89	+ 3 30.7	+ 25 44.0	+ 26 17.0	298 24.5	256 5.8
28	37.63	16.40	+ 3 33.0	+ 25 50.4	+ 26 20.5	298 42.8	256 24.2
Sept. 17	36.44	15.98	+ 3 40.0	+ 26 0.5	+ 26 23.8	299 42.4	257 23.9
Oct. 7	35.42	15.65	+ 3 51.1	+ 26 12.7	+ 26 26.8	301 18.5	259 0.0
27	34.66	15.42	+ 4 5.3	+ 26 25.0	+ 26 29.6	303 23.8	261 5.5
Nov. 16	34.18	15.30	+ 4 21.5	+ 26 35.5	+ 26 32.3	305 49.7	263 31.4
Dec. 6	34.02	15.29	+ 4 38.3	+ 26 43.0	+ 26 34.8	308 26.4	266 8.2
26	34.18	15.40	+ 4 54.6	+ 26 46.7	+ 26 37.0	311 3.5	268 45.4
31	34.27	15.44	+ 4 58.4	+ 26 47.0	+ 26 37.6	311 41.6	269 23.5

The factor to be multiplied by *a* and *b* to obtain the axes of—

The inner ellipse of the outer ring = 0.8801,

log factor = 9.9445

The outer ellipse of the inner ring = 0.8599,

log factor = 9.9344

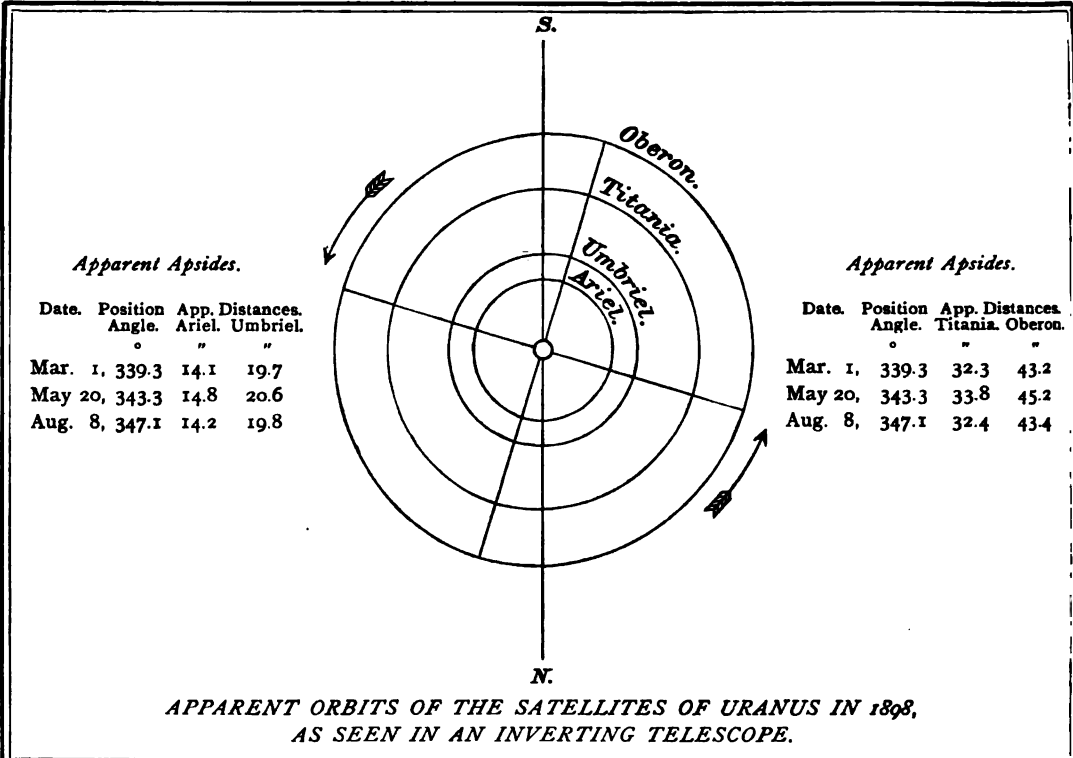
The inner ellipse of the inner ring = 0.6650,

log factor = 9.8228

The inner ellipse of the dusky ring = 0.5486,

log factor = 9.7392

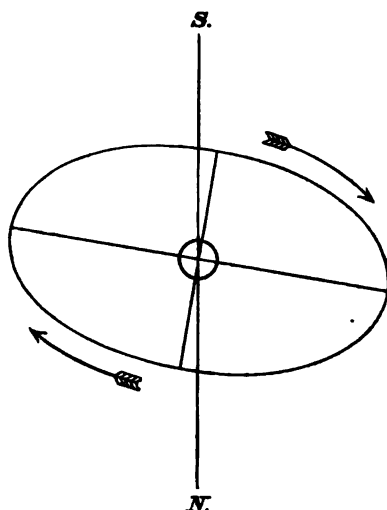
NOTE.—The positive sign of *l* indicates that the visible surface of the ring is the northern one.



WASHINGTON MEAN TIME OF GREATEST ELONGATION.

ARIEL.		UMBRIEL.		TITANIA.		OBERON.
North.	South.	North.	South.	North.	South.	North and South.
d h	d h	d h	d h	d h	d h	d h
Mar. 16 19.7	Mar. 20 14.5	Mar. 8 1.2	Mar. 10 3.0	Feb. 27 4.7	Mar. 3 13.1	Mar. 13 3.1 N.
24 9.2	28 4.0	16 8.2	18 9.9	Mar. 7 21.6	12 6.0	19 20.7 S.
31 22.7	Apr. 4 17.5	24 15.1	26 16.9	16 14.5	20 23.0	26 14.4 N.
Apr. 8 12.2	12 7.0	Apr. 1 22.1	Apr. 3 23.9	25 7.6	29 16.1	Apr. 2 8.2 S.
16 1.8	19 20.5	10 5.1	12 6.9	Apr. 3 0.7	Apr. 7 9.3	9 2.0 N.
23 15.3	27 10.1	18 12.2	20 13.9	11 17.9	16 2.5	15 19.9 S.
May 1 4.8	May 4 23.6	26 19.2	28 21.0	20 11.1	24 19.7	22 13.8 N.
8 18.4	12 13.2	May 5 2.3	May 7 4.0	29 4.4	May 3 13.0	29 7.8 S.
16 7.9	20 2.7	13 9.4	15 11.1	May 7 21.6	12 6.3	May 6 1.8 N.
23 21.5	27 16.3	21 16.4	23 18.2	16 14.9	20 23.6	12 19.7 S.
31 11.0	June 4 5.8	29 23.5	June 1 1.3	25 8.2	29 16.9	19 13.7 N.
June 8 0.6	11 19.4	June 7 6.6	9 8.4	June 3 1.5	June 7 10.1	26 7.7 S.
15 14.1	19 8.9	15 13.6	17 15.4	11 18.7	16 3.4	June 2 1.7 N.
23 3.7	26 22.4	23 20.7	25 22.5	20 12.0	24 20.6	8 19.6 S.
30 17.2	July 4 12.0	July 2 3.7	July 4 5.5	29 5.2	July 3 13.7	15 13.5 N.
July 8 6.7	12 1.5	10 10.7	12 12.5	July 7 22.3	12 6.9	22 7.4 S.
15 20.3	19 15.0	18 17.7	20 19.5	16 15.4	21 0.0	29 1.2 N.
23 9.8	27 4.5	27 0.7	29 2.4	25 8.5	29 17.0	July 5 19.0 S.
30 23.3	Aug. 3 18.0	Aug. 4 7.7	Aug. 6 9.4	Aug. 3 1.5	Aug. 7 10.0	12 12.8 N.
Aug. 7 12.8	11 7.5	12 14.6	14 16.3	11 18.4	16 2.9	19 6.5 S.
15 2.2	18 21.0	20 21.5	22 23.2	20 11.3	24 19.8	26 0.2 N.
22 15.7	26 10.4	29 4.4	31 6.1	29 4.2	Sept. 2 12.6	Aug. 1 17.8 S.
30 5.2	Sept. 2 23.9	Sept. 6 11.3	Sept. 8 13.0	Sept. 6 21.0	11 5.4	8 11.4 N.
Sept. 6 18.6	10 13.3	14 18.1	16 19.8	15 13.8	19 22.1	15 5.0 S.
14 8.0	18 2.7	23 1.0	25 2.7	24 6.5	28 14.8	21 22.4 N.
Period of Ariel, d h 2 12.489		Period of Titania, d h 8 16.942		Period of Oberon, d h 13 11.119		
Period of Umbriel, 4 3.460						

NOTE.—For Ariel only every third elongation is given, and for Umbriel every alternate one. The intermediate ones may be found by adding multiples of the period of the satellite.



Date.	Position Angle of Apsis.	Apparent Distance at Apsis.
	°	"
Mar. 5,	255.2	+ 16.4
Sept. 21,	260.7	+ 16.4
Dec. 10,	259.3	+ 16.9

APPARENT ORBIT OF THE SATELLITE OF NEPTUNE IN 1898,  
AS SEEN IN AN INVERTING TELESCOPE.

WASHINGTON MEAN TIME OF GREATEST ELONGATION.

East.		West.		East.		West.		East.		West.	
d	h	d	h	d	h	d	h	d	h	d	h
Jan.	1 3.2	Jan.	4 1.8	Mar.	12 16.3	Mar.	15 14.8	Oct.	27 18.8	Oct.	30 17.3
	7 0.3		9 22.9		18 13.3		21 11.8	Nov.	2 15.8	Nov.	5 14.4
	12 21.5		15 20.1		24 10.3		27 8.8		8 12.9		11 11.4
	18 18.6		21 17.2		30 7.3	Sept.	7 19.8		14 10.0		17 8.5
	24 15.7		27 14.3	Sept.	10 18.4		13 16.9		20 7.1		23 5.6
					16 15.4		19 13.9		26 4.2		29 2.7
Feb.	30 12.8	Feb.	2 11.4		22 12.4		25 11.0	Dec.	2 1.3	Dec.	4 23.9
	5 10.0		8 8.5		28 9.5	Oct.	1 8.0		7 22.4		10 21.0
	11 7.0		14 5.6	Oct.	4 6.5		7 5.0		13 19.6		16 18.1
	17 4.1		20 2.7		10 3.5		13 2.1		19 16.7		22 15.3
	23 1.2		25 23.7						25 13.8		28 12.4
Mar.	28 22.2	Mar.	3 20.8		16 0.6		18 23.1		31 11.0	Jan.	3 9.5
	6 19.3		9 17.8		21 21.7		24 20.2				

The above times are those of each passage of the satellite through the apsis of its apparent orbit. The position of the satellite at any other time may be found by measuring around the orbit from the apsis last passed through, remembering that the radius vector of the satellite describes equal areas in equal times.

Period of the satellite of Neptune, 5<sup>d</sup>21<sup>h</sup>.046.

NOTE.—In the preceding diagrams the central circle represents the planet and is on the same scale as the orbits.

WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

[illegible]

## WASHINGTON MEAN TIME.

## PLANETARY CONSTELLATIONS.

d h m			d h m		
July	3	-	Oct.	14	18 42
	6	6		14	21 38
	13	3 45		15	23 -
	15	8 31		17	1 -
	18	-		17	16 0
	20	1 30		18	1 31
	20	18 11		18	5 1
	23	21 53		18	22 -
	26	17 -		21	20 -
	27	18 48		25	17 -
	28	5 14		26	23 -
Aug.	7	8 -	Nov.	1	16 42
	8	15 -		4	22 -
	8	23 -		4	22 31
	9	8 -		10	17 -
	11	0 11		11	10 -
	11	16 37		11	17 23
	13	17 -		14	3 6
	18	13 -		14	9 57
	18	20 51		14	17 51
	20	11 39		15	0 7
	20	15 6		18	1 -
	21	19 -		19	15 -
	22	0 -		23	15 -
	24	1 23		25	7 -
	24	9 -		25	8 -
	24	12 7	Dec.	28	22 59
	28	15 -		1	0 -
	29	8 -		2	20 9
	31	1 -		3	4 -
Sept.	5	0 -		4	20 -
	8	0 57		6	2 -
	8	19 33		9	13 3
	13	13 -		10	1 -
	14	4 1		10	5 -
	16	23 -		11	15 33
	17	1 -		11	16 -
	17	3 32		11	16 31
	17	9 -		12	-
	19	1 38		12	9 28
	20	7 49		13	20 5
	20	19 29		14	8 -
	21	1 -		14	14 -
	21	16 -		18	22 -
	21	23 -		20	18 -
	22	7 -		21	2 -
	27	2 -		21	5 -
Oct.	2	5 -		26	4 5
	5	9 11		27	-
	7	12 12		29	5 -
	9	13 -		29	21 40
	9	20 -		31	3 -
	13	6 -		31	15 -

## POSITIONS OF OBSERVATORIES.

*(North Latitudes and West Longitudes are Considered Positive.)*

Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\rho$ .	Longitude.	
				From Washington.	From Greenwich.
	° ' "	' "		h m s	h m s
Abastuman . . .	+ 41° 42' 24"	- 11 35.5	9.999351	- 7 59 37	- 2 51 25
Åbo . . .	+ 60 26 56.8	- 10 2.1	9.998887	- 6 37 18.45	- 1 29 6.41
Adelaide . . .	- 34 55 38.5	+ 10 56.8	9.999520	- 14 22 32.30	- 9 14 20.30
Albany ( <i>New Obs.</i> ) . .	+ 42 39 12.7	- 11 38.0	9.999326	- 0 13 5.2	+ 4 55 6.8
Albany ( <i>Old Obs.</i> ) . .	+ 42 39 49.5	- 11 38.0	9.999326	- 0 13 12.82	+ 4 54 59.22
Alfred ( <i>N. Y.</i> ) . . .	+ 42 15 19.8	- 11 37.0	9.999337	+ 0 2 55.00	+ 5 11 7.04
Algiers ( <i>Old Obs.</i> ) . .	+ 36 44 0	- 11 10.8	9.999476	- 5 20 28.8	- 0 12 16.8
Algiers ( <i>New Obs.</i> ) . .	+ 36 47 50	- 11 11.3	9.999474	- 5 20 20.59	- 0 12 8.55
Allegheny . . .	+ 40 27 41.6	- 11 31.3	9.999383	+ 0 11 50.89	+ 5 20 2.93
Altona . . .	+ 53 32 45.3	- 11 10.2	9.999049	- 5 47 58.39	- 0 39 46.35
Amherst . . .	+ 42 22 17.1	- 11 37.3	9.999334	- 0 18 7.37	+ 4 50 4.67
Annapolis . . .	+ 38 58 53.5	- 11 24.5	9.999420	- 0 2 15.55	+ 5 5 56.49
Ann Arbor . . .	+ 42 16 48.0	- 11 37.0	9.999336	+ 0 26 43.15	+ 5 34 55.19
Arequipa ( <i>Harvard</i> ) . .	- 16 24	+ 6 18.4	9.999884	- 0 22 42	+ 4 45 30
Armagh . . .	+ 54 21 12.7	- 11 4.2	9.999029	- 4 41 36.6	+ 0 26 35.4
Athens . . .	+ 37 58 20.7	- 11 18.9	9.999445	- 6 43 6.9	- 1 34 54.9
Bamberg . . .	+ 49 53 5	- 11 30.7	9.999141	- 5 51 45.4	- 0 43 33.4
Beloit . . .	+ 42 30 9.0	- 11 37.6	9.999331	+ 0 47 55.3	+ 5 56 7.3
Bergen . . .	+ 60 23 54	- 10 2.7	9.998888	- 5 29 24.8	- 0 21 12.8
Berkeley . . .	+ 37 52 21.7	- 11 18.3	9.999448	+ 3 0 50.33	+ 8 9 2.37
Berlin . . .	+ 52 30 16.7	- 11 17.1	9.999075	- 6 1 46.95	- 0 53 34.91
Berlin ( <i>Urani.</i> ) . . .	+ 52 31 30.7	- 11 17.0	9.999075	- 6 1 39.55	- 0 53 27.51
Berne . . .	+ 46 57 8.7	- 11 39.0	9.999216	- 5 37 57.7	- 0 29 45.7
Besançon . . .	+ 47 14 59.0	- 11 38.5	9.999208	- 5 32 9.2	- 0 23 57.2
Bethlehem . . .	+ 40 36 23.4	- 11 31.9	9.999379	- 0 6 40.19	+ 5 1 31.85
Birr Castle . . .	+ 53 5 47.0	- 11 13.3	9.999060	- 4 36 31.1	+ 0 31 40.9
Bogota . . .	+ 4 35 48	- 1 51.5	9.999991	- 0 11 13	+ 4 56 59
Bologna . . .	+ 44 29 47.0	- 11 40.3	9.999279	- 5 53 36.9	- 0 45 24.9
Bombay . . .	+ 18 53 45	- 7 8.1	9.999847	- 9 59 27.78	- 4 51 15.74
Bonn . . .	+ 50 43 45.0	- 11 26.9	9.999120	- 5 36 35.33	- 0 28 23.29
Bordeaux . . .	+ 44 50 7.2	- 11 40.4	9.999271	- 5 6 6.63	+ 0 2 5.41
Bothkamp . . .	+ 54 12 9.6	- 11 5.3	9.999033	- 5 48 43.2	- 0 40 31.2
Breslau . . .	+ 51 6 56.5	- 11 25.0	9.999110	- 6 16 20.88	- 1 8 8.84
Brisbane . . .	- 27 28 0.0	+ 9 32.2	9.999689	- 15 20 18.44	- 10 12 6.40
Brussels ( <i>Uccle</i> ) . . .	+ 50 47 53	- 11 26.6	9.999118	- 5 25 38.2	- 0 17 26.2
Brussels ( <i>Old Obs.</i> ) . .	+ 50 51 10.7	- 11 26.3	9.999117	- 5 25 40.7	- 0 17 28.7
Budapest . . .	+ 47 29 34.7	- 11 38.0	9.999202	- 6 24 27.4	- 1 16 15.4
Cairo . . .	+ 30 4 38.2	- 10 6.5	9.999632	- 7 13 20.95	- 2 5 8.91
Cambridge ( <i>England</i> ) . .	+ 52 12 51.6	- 11 18.9	9.999082	- 5 8 34.79	- 0 0 22.75
Cambridge ( <i>Mass.</i> ) . . .	+ 42 22 47.6	- 11 37.3	9.999334	- 0 23 41.05	+ 4 44 30.99
Cape of Good Hope . .	- 33 56 3.6	+ 10 48.0	9.999543	- 6 22 6.80	- 1 13 54.76
Catania . . .	+ 37 30 13	- 11 16.0	9.999457	- 6 8 31	- 1 0 19
Chapultepec . . .	+ 19 25 17.5	- 7 18.2	9.999838	+ 1 28 26.20	+ 6 36 38.24
Charkow . . .	+ 50 0 9.6	- 11 30.2	9.999138	- 7 33 7.81	- 2 24 55.77
Charlottesville . . .	+ 38 2 1.2	- 11 19.3	9.999444	+ 0 5 53.18	+ 5 14 5.22



## POSITIONS OF OBSERVATORIES.

*(North Latitudes and West Longitudes are Considered Positive.)*

Place.	Latitude.	Reduction to Geocentric Latitude.	Log p.	Longitude.	
				From Washington.	From Greenwich.
	° ' "	' "		h m s	h m s
Chicago ( <i>Old Obs.</i> ) . . .	+ 41 50 1.0	- 11 35.9	9.999348	+ 0 42 14.69	+ 5 50 26.73
Christiania . . .	+ 59 54 44.0	- 10 8.7	9.998899	- 5 51 5.62	- 0 42 53.58
Cincinnati ( <i>New Obs.</i> ) .	+ 39 8 19.5	- 11 25.4	9.999416	+ 0 29 29.25	+ 5 37 41.29
Cincinnati ( <i>Old Obs.</i> ) .	+ 39 6 26.5	- 11 25.2	9.999417	+ 0 29 47.01	+ 5 37 59.05
Clinton . . .	+ 43 3 17.0	- 11 38.7	9.999316	- 0 6 34.59	+ 5 1 37.45
Coimbra . . .	+ 40 12 24.5	- 11 30.3	9.999389	- 4 34 28.9	+ 0 33 43.1
Columbia ( <i>Missouri</i> ) . .	+ 38 56 51.7	- 11 24.4	9.999421	+ 1 1 6.29	+ 6 9 18.33
Copenhagen . . .	+ 55 41 12.9	- 10 53.1	9.998997	- 5 58 30.80	- 0 50 18.76
Cordoba . . .	- 31 25 15.5	+ 10 22.2	9.999602	- 0 51 23.8	+ 4 16 48.2
Cracow . . .	+ 50 3 51.9	- 11 29.9	9.999137	- 6 28 2.41	- 1 19 50.37
Crowborough . . .	+ 51 3 6.5	- 11 25.4	9.999112	- 5 8 49.3	- 0 0 37.3
Dantzic . . .	+ 54 21 18.0	- 11 4.1	9.999029	- 6 22 51.6	- 1 14 39.6
Denver . . .	+ 39 40 36.4	- 11 27.9	9.999402	+ 1 51 35.59	+ 6 59 47.63
Dorpat . . .	+ 58 22 47.1	- 10 26.4	9.998934	- 6 55 5.39	- 1 46 53.35
Dresden . . .	+ 51 2 16.8	- 11 25.4	9.999112	- 6 3 6.88	- 0 54 54.84
Dublin . . .	+ 53 23 13.0	- 11 11.3	9.999053	- 4 42 50.9	+ 0 25 21.1
Dun Echt . . .	+ 57 9 36	- 10 39.2	9.998962	- 4 58 32.0	+ 0 9 40.0
Durham . . .	+ 54 46 6.2	- 11 0.9	9.999019	- 5 1 52.29	+ 0 6 19.75
Düsseldorf . . .	+ 51 12 25.0	- 11 24.6	9.999108	- 5 35 17.5	- 0 27 5.5
Edinburgh . . .	+ 55 57 23.2	- 10 50.7	9.998991	- 4 55 28.99	+ 0 12 43.05
Evanston ( <i>Dearborn</i> ) .	+ 42 3 33.4	- 11 36.5	9.999342	+ 0 42 30.3	+ 5 50 42.3
Florence ( <i>Reale Museo</i> )	+ 43 46 4.1	- 11 39.7	9.999298	- 5 53 13.5	- 0 45 1.5
Florence ( <i>Arcetri</i> ) . .	+ 43 45 14.6	- 11 39.7	9.999298	- 5 53 13.44	- 0 45 1.40
Geneva . . .	+ 46 11 58.8	- 11 39.9	9.999236	- 5 32 48.81	- 0 24 36.77
Genoa . . .	+ 44 25 9.3	- 11 40.2	9.999281	- 5 43 53.4	- 0 35 41.4
Georgetown . . .	+ 38 54 26.0	- 11 24.2	9.999422	+ 0 0 6.20	+ 5 8 18.24
Glasgow ( <i>Missouri</i> ) . .	+ 39 13 45.6	- 11 25.8	9.999414	+ 1 3 5.93	+ 6 11 17.97
Glasgow ( <i>Scotland</i> ) . .	+ 55 52 42.8	- 10 51.5	9.998993	- 4 51 1.4	+ 0 17 10.55
Gohlis . . .	+ 51 21 35.0	- 11 23.7	9.999104	- 5 57 41.69	- 0 49 29.65
Gotha ( <i>Old Obs.</i> ) . .	+ 50 56 5.2	- 11 26.0	9.999114	- 5 51 7.20	- 0 42 55.16
Gotha . . .	+ 50 56 37.9	- 11 25.9	9.999114	- 5 51 2.60	- 0 42 50.56
Göttingen . . .	+ 51 31 48.2	- 11 22.8	9.999100	- 5 47 58.38	- 0 39 46.34
Graz . . .	+ 47 4 37.2	- 11 38.8	9.999213	- 6 10 0	- 1 1 48
Greenwich . . .	+ 51 28 38.1	- 11 23.1	9.999101	- 5 8 12.04	0 0 0.00
Grignon . . .	+ 47 33 42	- 11 37.8	9.999201	- 5 25 50	- 0 17 38
Hamburg . . .	+ 53 33 7.0	- 11 10.1	9.999049	- 5 48 5.7	- 0 39 53.8
Hanover . . .	+ 43 42 15.3	- 11 39.6	9.999300	- 0 19 4.13	+ 4 49 7.91
Harrow . . .	+ 51 34 47.1	- 11 22.6	9.999098	- 5 6 52.1	+ 0 1 19.9
Hastings-on-Hudson . .	+ 40 59 25	- 11 33.2	9.999369	- 0 12 42.4	+ 4 55 29.6
Haverford . . .	+ 40 0 40.1	- 11 29.4	9.999394	- 0 6 59.34	+ 5 1 12.70
Heidelberg . . .	+ 49 24 35	- 11 32.5	9.999153	- 5 43 0.5	- 0 34 48.5
Helsingfors . . .	+ 60 9 42.6	- 10 5.6	9.998893	- 6 48 1.18	- 1 39 49.14
Hereny . . .	+ 47 15 47.4	- 11 38.4	9.999208	- 6 14 36.7	- 1 6 24.7
Hongkong . . .	+ 22 18 12.2	- 8 10.7	9.999789	- 12 44 53.9	- 7 36 41.9
Hudson . . .	+ 41 14 42.6	- 11 34.1	9.999363	+ 0 17 32.12	+ 5 25 44.16

POSITIONS OF OBSERVATORIES.					
(North Latitudes and West Longitudes are Considered Positive.)					
Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\rho$ .	Longitude.	
				From Washington.	From Greenwich.
Jamaica . . . .	+ 18 24 51	- 6 58.7	9.999854	+ 0 3 17.5	+ 5 11 29.5
Jena ( <i>University</i> ) . . . .	+ 50 55 35.6	- 11 26.0	9.999115	- 5 54 32.8	- 0 46 20.8
Kalocsa . . . .	+ 46 31 42	- 11 39.6	9.999227	- 6 24 6.3	- 1 15 54.3
Karlsruhe . . . .	+ 49 0 29.6	- 11 33.9	9.999163	- 5 41 48.5	- 0 33 36.5
Kasan . . . .	+ 55 47 24.4	- 10 52.2	9.998995	- 8 24 41.11	- 3 16 29.07
Kew . . . .	+ 51 28 6	- 11 23.2	9.999101	- 5 6 56.9	+ 0 1 15.1
Kiel . . . .	+ 54 20 28.5	- 11 4.2	9.999030	- 5 48 47.73	- 0 40 35.69
Kiew . . . .	+ 50 27 10.5	- 11 28.2	9.999127	- 7 10 12.77	- 2 2 0.73
Kis Kartal . . . .	+ 47 41 54.8	- 11 37.5	9.999197	- 6 26 23.7	- 1 18 11.7
Königsberg . . . .	+ 54 42 50.4	- 11 1.3	9.999021	- 6 30 11.15	- 1 21 59.11
Kremsmünster . . . .	+ 48 3 23.1	- 11 36.7	9.999188	- 6 4 43.68	- 0 56 31.64
La Plata . . . .	- 34 54 30.3	+ 10 56.7	9.999520	- 1 16 35.0	+ 3 51 37.0
Leiden . . . .	+ 52 9 20.0	- 11 19.3	9.999084	- 5 26 8.26	- 0 17 56.22
Leipzig . . . .	+ 51 20 5.9	- 11 23.9	9.999104	- 5 57 46.06	- 0 49 34.02
Liege ( <i>Ougrée</i> ) . . . .	+ 50 37 7	- 11 27.5	9.999123	- 5 30 27.2	- 0 22 15.2
Lisbon ( <i>Marine Obs.</i> ) . . . .	+ 38 42 17.6	- 11 23.3	9.999427	- 4 31 38.5	+ 0 36 33.5
Lisbon ( <i>Royal Obs.</i> ) . . . .	+ 38 42 31.3	- 11 23.1	9.999427	- 4 31 27.36	+ 0 36 44.68
Liverpool . . . .	+ 53 24 4.8	- 11 11.2	9.999053	- 4 55 54.71	+ 0 12 17.33
Lübec . . . .	+ 53 51 31.1	- 11 7.9	9.999042	- 5 50 57.7	- 0 42 45.7
Lund . . . .	+ 55 41 51.6	- 10 53.0	9.998997	- 6 0 57.06	- 0 52 45.02
Lyons . . . .	+ 45 41 40.9	- 11 40.3	9.999248	- 5 27 20.66	- 0 19 8.62
Madison . . . .	+ 43 4 37.0	- 11 38.7	9.999316	+ 0 49 25.78	+ 5 57 37.82
Madras . . . .	+ 13 4 8.1	- 5 7.6	9.999925	- 10 29 11.39	- 5 20 59.35
Madrid . . . .	+ 40 24 29.7	- 11 31.1	9.999384	- 4 53 27.0	+ 0 14 45.0
Manilla . . . .	+ 14 35 25	- 5 40.5	9.999907	- 13 12 2	- 8 3 50
Mannheim . . . .	+ 49 29 11.0	- 11 32.2	9.999151	- 5 42 2.56	- 0 33 50.52
Marburg . . . .	+ 50 48 46.9	- 11 26.5	9.999118	- 5 43 17.0	- 0 35 5.0
Markree . . . .	+ 54 10 31.8	- 11 5.5	9.999034	- 4 34 23.6	+ 0 33 48.4
Marseilles . . . .	+ 43 18 17.5	- 11 39.1	9.999310	- 5 29 46.68	- 0 21 34.64
Mauritius . . . .	- 20 5 39	+ 7 30.8	9.999828	- 8 58 24.6	- 3 50 12.6
Melbourne . . . .	- 37 49 53.2	+ 11 18.1	9.999449	- 14 48 6.19	- 9 39 54.15
Meudon . . . .	+ 48 48 18	- 11 34.6	9.999169	- 5 17 7.6	- 0 8 55.6
Mexico . . . .	+ 19 26 1.3	- 7 18.4	9.999838	+ 1 28 14.63	+ 6 36 26.67
Middletown ( <i>Conn.</i> ) . . . .	+ 41 33 16.0	- 11 35.1	9.999355	+ 0 17 34.86	+ 4 50 37.18
Milan . . . .	+ 45 27 59.2	- 11 40.4	9.999254	- 5 44 58.01	- 0 36 45.97
Modena . . . .	+ 44 38 52.8	- 11 40.4	9.999275	- 5 51 54.9	- 0 43 42.9
Moncalieri . . . .	+ 44 59 51	- 11 40.4	9.999266	- 5 39 1	- 0 30 49
Montreal . . . .	+ 45 30 17.0	- 11 40.4	9.999253	- 0 13 53.50	+ 4 54 18.54
Montsouris . . . .	+ 48 49 18.0	- 11 34.5	9.999168	- 5 17 32.72	- 0 9 20.68
Moscow . . . .	+ 55 45 19.8	- 10 52.5	9.998995	- 7 38 29.21	- 2 30 17.17
Mount Hamilton . . . .	+ 37 20 24.6	- 11 14.9	9.999461	+ 2 58 22.77	+ 8 6 34.81
Munich . . . .	+ 48 8 45.5	- 11 36.5	9.999186	- 5 54 38.17	- 0 46 26.13
Naples . . . .	+ 40 51 46.0	- 11 32.8	9.999372	- 6 5 13.83	- 0 57 1.79
Nashville . . . .	+ 36 8 54.4	- 11 6.6	9.999490	+ 0 39 0.2	+ 5 47 12.2
Natal . . . .	- 29 50 46.6	+ 10 3.7	9.999637	- 7 12 13.22	- 2 4 1.18

## POSITIONS OF OBSERVATORIES.

(North Latitudes and West Longitudes are Considered Positive.)

Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\mu$ .	Longitude.	
				From Washington.	From Greenwich.
Neuchatel . . . .	+ 47 0 1.2	- 11 38.9	9.999215	- 5 36 1.90	- 0 27 49.86
New Haven ( <i>Old Obs'y</i> )	+ 41 18 36.5	- 11 34.3	9.999361	- 0 16 29.90	+ 4 51 42.14
New Haven ( <i>Yale Univ.</i> )	+ 41 19 22.3	- 11 34.4	9.999361	- 0 16 31.48	+ 4 51 40.56
New York ( <i>Columb. Coll.</i> )	+ 40 45 23.1	- 11 32.4	9.999375	- 0 12 18.40	+ 4 55 53.64
New York ( <i>RUTHERFURD</i> )	+ 40 43 48.5	- 11 32.3	9.999376	- 0 12 15	+ 4 55 57
Nice . . . .	+ 43 43 16.9	- 11 39.6	9.999299	- 5 37 24.29	- 0 29 12.25
Nicolaëff . . . .	+ 46 58 21.3	- 11 38.9	9.999216	- 7 16 5.91	- 2 7 53.87
Northfield . . . .	+ 44 27 41.6	- 11 40.3	9.999280	+ 1 4 23.77	+ 6 12 35.81
Oakland ( <i>Cal.</i> ) . . .	+ 37 48 5	- 11 17.9	9.999449	+ 3 0 54.58	+ 8 9 6.62
Odessa . . . .	+ 46 28 36.7	- 11 39.6	9.999228	- 7 11 14.20	- 2 3 2.16
Ogden . . . .	+ 41 13 8.6	- 11 34.0	9.999363	+ 2 19 47.52	+ 7 27 59.56
O-Gyalla . . . .	+ 47 52 27.3	- 11 37.1	9.999192	- 6 20 57.64	- 1 12 45.60
Olmütz . . . .	+ 49 35 43	- 11 31.8	9.999149	- 6 17 20	- 1 9 8
Oxford ( <i>Mississippi</i> ) .	+ 34 22 12.6	- 10 52.0	9.999533	+ 0 49 55.1	+ 5 58 7.1
Oxford ( <i>Radcliffe</i> ) .	+ 51 45 35.4	- 11 21.6	9.999094	- 5 3 9.4	+ 0 5 2.6
Oxford ( <i>University</i> ) .	+ 51 45 34.2	- 11 21.6	9.999094	- 5 3 11.6	+ 0 5 0.4
Padua . . . .	+ 45 24 2.5	- 11 40.4	9.999256	- 5 55 41.24	- 0 47 29.20
Palermo . . . .	+ 38 6 44.0	- 11 19.7	9.999442	- 6 1 38.01	- 0 53 25.97
Paramatta . . . .	- 33 48 49.8	+ 10 46.9	9.999546	- 15 12 12.2	- 10 4 0.2
Paris . . . .	+ 48 50 11.2	- 11 34.5	9.999168	- 5 17 33.07	- 0 9 21.03
Philadelphia . . . .	+ 39 57 7.5	- 11 29.2	9.999396	- 0 7 33.58	+ 5 0 38.46
Plonsk . . . .	+ 52 37 40.0	- 11 16.4	9.999072	- 6 29 44.0	- 1 21 32.0
Pola . . . .	+ 44 51 48.7	- 11 40.4	9.999270	- 6 3 34.98	- 0 55 22.94
Portsmouth . . . .	+ 50 48 3	- 11 26.6	9.999118	- 5 3 47.2	+ 0 4 24.8
Potsdam . . . .	+ 52 22 56.0	- 11 17.9	9.999078	- 6 0 27.9	- 0 52 15.9
Poughkeepsie . . . .	+ 41 41 18	- 11 35.5	9.999351	- 0 12 38.4	+ 4 55 33.6
Prague ( <i>University</i> ) .	+ 50 5 15.8	- 11 29.8	9.999136	- 6 5 52.3	- 0 57 40.3
Princeton . . . .	+ 40 20 57.8	- 11 30.8	9.999385	- 0 9 34.54	+ 4 58 37.50
Princeton ( <i>Halsted</i> ) .	+ 40 20 55.8	- 11 30.9	9.999386	- 0 9 32.60	+ 4 58 39.44
Providence ( <i>SEAGRAVE</i> )	+ 41 49 46	- 11 35.9	9.999348	- 0 22 34.52	+ 4 45 37.52
Providence ( <i>Ladd</i> ) .	+ 41 50 21	- 11 35.9	9.999348	- 0 22 36.09	+ 4 45 35.95
Pulkowa . . . .	+ 59 46 18.7	- 10 10.4	9.998902	- 7 9 30.71	- 2 1 18.67
Quebec . . . .	+ 46 47 59.2	- 11 39.2	9.999220	- 0 23 19.40	+ 4 44 52.64
Quito . . . .	- 0 14 0	+ 0 5.7	0.000000	+ 0 7 8	+ 5 15 20
Riga . . . .	+ 56 57 7	- 10 41.3	9.998967	- 6 44 40	- 1 36 28
Rio de Janeiro . . . .	- 22 54 23.7	+ 8 21.1	9.999779	- 2 15 30.6	+ 2 52 41.4
Rochester . . . .	+ 43 9 16.8	- 11 38.8	9.999314	+ 0 2 9.74	+ 5 10 21.78
Rome ( <i>Coll. Rom.</i> ) .	+ 41 53 53.6	- 11 36.1	9.999346	- 5 58 7.59	- 0 49 55.55
Rome ( <i>Capitol</i> ) . . .	+ 41 53 33.5	- 11 36.0	9.999346	- 5 58 8.47	- 0 49 56.43
Rome ( <i>Vatican</i> ) . . .	+ 41 54 4.8	- 11 36.1	9.999346	- 5 58 1.4	- 0 49 49.4
Rousdon . . . .	+ 50 42 38	- 11 27.0	9.999120	- 4 56 13.10	+ 0 11 58.94
Rugby . . . .	+ 52 22 7	- 11 18.0	9.999079	- 5 3 10.0	+ 0 5 2.0
San Fernando . . . .	+ 36 27 41.5	- 11 8.9	9.999483	- 4 43 22.4	+ 0 24 49.6
San Francisco . . . .	+ 37 47 27.9	- 11 17.8	9.999450	+ 3 1 30.73	+ 8 9 42.77
Santiago de Chile . .	- 33 26 42.0	+ 10 43.4	9.999555	- 0 25 25.7	+ 4 42 46.3

## POSITIONS OF OBSERVATORIES.

*(North Latitudes and West Longitudes are Considered Positive.)*

Place.	Latitude.	Reduction to Geocentric Latitude.	Log $\rho$ .	Longitude.	
				From Washington.	From Greenwich.
	° ' "	' "		h m s	h m s
Schwerin . . . .	+ 53 37 37.9	- 11 9.6	9.999047	- 5 53 52.9	- 0 45 40.9
South Hadley . . .	+ 42 15 18.2	- 11 37.0	9.999337	- 0 17 51.75	+ 4 50 20.29
Speier . . . . .	+ 49 18 55.2	- 11 32.9	9.999156	- 5 41 57.66	- 0 33 45.62
St. Louis . . . . .	+ 38 38 3.6	- 11 22.7	9.999429	+ 0 52 37.07	+ 6 0 49.11
St. Petersburg ( <i>Academy</i> )	+ 59 56 29.7	- 10 8.4	9.998898	- 7 9 25.50	- 2 1 13.46
St. Petersburg ( <i>Univ.</i> )	+ 59 56 32.0	- 10 8.4	9.998898	- 7 9 23.45	- 2 1 11.41
Stockholm . . . .	+ 59 20 33.0	- 10 15.5	9.998912	- 6 20 26.03	- 1 12 13.99
Stonyhurst . . . .	+ 53 50 40	- 11 8.0	9.999042	- 4 58 19.36	+ 0 9 52.68
Strassburg ( <i>New Obs.</i> )	+ 48 35 0.8	- 11 35.3	9.999174	- 5 39 16.69	- 0 31 4.65
Strassburg ( <i>Old Obs.</i> )	+ 48 34 53.8	- 11 35.3	9.999174	- 5 39 14.53	- 0 31 2.49
Sydney . . . . .	- 33 51 41.1	+ 10 47.3	9.999545	- 15 13 1.58	- 10 4 49.54
Syracuse . . . . .	+ 43 2 13.1	- 11 38.6	9.999317	- 0 3 38.68	+ 5 4 33.36
Tacubaya . . . . .	+ 19 24 17.5	- 7 17.8	9.999839	+ 1 28 34.49	+ 6 36 46.53
Taschkent . . . . .	+ 41 19 31.4	- 11 34.4	9.999361	- 9 45 22.84	- 4 37 10.80
Tokio . . . . .	+ 35 39 17.5	- 11 2.8	9.999502	- 14 27 10.0	- 9 18 58.0
Toronto . . . . .	+ 43 39 35.9	- 11 39.6	9.999301	+ 0 9 22.61	+ 5 17 34.65
Toulouse . . . . .	+ 43 36 45.3	- 11 39.5	9.999302	- 5 14 1.9	- 0 5 49.9
Trieste . . . . .	+ 45 38 45.4	- 11 40.3	9.999250	- 6 3 15.05	- 0 55 3.01
Troy ( <i>N. Y.</i> ) . . . .	+ 42 43 52.9	- 11 38.1	9.999325	- 0 13 29.75	+ 4 54 42.29
Tulse Hill . . . . .	+ 51 26 47.0	- 11 23.3	9.999102	- 5 7 44.3	+ 0 0 27.7
Turin . . . . .	+ 45 4 8.0	- 11 40.4	9.999265	- 5 38 59.27	- 0 30 47.23
Twickenham . . . .	+ 51 27 4.2	- 11 23.3	9.999102	- 5 6 58.9	+ 0 1 13.1
Upsala ( <i>New Obs.</i> ) . .	+ 59 51 29.4	- 10 9.3	9.998900	- 6 18 42.27	- 1 10 30.23
Utrecht . . . . .	+ 52 5 9.5	- 11 19.7	9.999086	- 5 28 43.2	- 0 20 31.2
Venice . . . . .	+ 45 26 10.5	- 11 40.4	9.999255	- 5 57 34.16	- 0 49 22.12
Vienna ( <i>Josephstadt</i> ) .	+ 48 12 53.8	- 11 36.2	9.999183	- 6 13 37.3	- 1 5 25.3
Vienna ( <i>New Obs.</i> ) . .	+ 48 13 55.4	- 11 36.2	9.999183	- 6 13 33.53	- 1 5 21.49
Vienna ( <i>Old Obs.</i> ) . .	+ 48 12 35.5	- 11 36.3	9.999184	- 6 13 43.74	- 1 5 31 70
Vienna ( <i>Ottakring</i> ) . .	+ 48 12 46.7	- 11 36.2	9.999183	- 6 13 23.15	- 1 5 11.11
Warsaw . . . . .	+ 52 13 5.7	- 11 18.9	9.999082	- 6 32 19.4	- 1 24 7.4
Washington . . . . .	+ 38 53 38.8	- 11 24.1	9.999422	0 0 0	+ 5 8 12.04
Washington ( <i>New Obs.</i> )	+ 38 55 14.7	- 11 24.2	9.999422	+ 0 0 3.67	+ 5 8 15.71
Washington ( <i>Smithsonian</i> )	+ 38 53 17.3	- 11 24.1	9.999422	- 0 0 5.8	+ 5 8 6.2
Wellington . . . . .	- 41 18 0.6	+ 11 34.3	9.999361	- 16 47 18.56	- 11 39 6.52
West Point ( <i>Old Obs.</i> )	+ 41 23 31	- 11 34.6	9.999359	- 0 12 22.71	+ 4 55 49.33
West Point ( <i>New Obs.</i> )	+ 41 23 22.1	- 11 34.6	9.999359	- 0 12 21.49	+ 4 55 50.55
Wilhelmshaven . . . .	+ 53 31 52.2	- 11 10.3	9.999050	- 5 40 47.25	- 0 32 35.21
Williamstown ( <i>Mass.</i> ) .	+ 42 42 30	- 11 38.0	9.999325	- 0 15 22	+ 4 52 50
Williamstown ( <i>Victoria</i> )	- 37 52 7.2	+ 11 18.3	9.999448	- 14 47 50.8	- 9 39 38.8
Wilna . . . . .	+ 54 40 59.1	- 11 1.6	9.999021	- 6 49 20.91	- 1 41 8.87
Windsor . . . . .	- 33 36 30.8	+ 10 44.9	9.999551	- 15 11 32.55	- 10 3 20.51
Zürich . . . . .	+ 47 22 40.0	- 11 38.2	9.999205	- 5 42 24.40	- 0 34 12.36

# ON THE ARRANGEMENT AND USE OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC.

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## PART I—THE EPHEMERIS FOR THE MERIDIAN OF GREENWICH.

The greater portion of this Ephemeris, embracing the positions of the sun and moon; the distances of the moon from the centres of the sun and of the four most conspicuous planets, and from certain fixed stars; the ephemerides of the planets Mercury, Venus, Mars, Jupiter, and Saturn, is designed for the special use of navigators. The remainder contains the ephemerides of Uranus and Neptune, the heliocentric co-ordinates of the seven major planets, the rectangular equatorial co-ordinates of the sun, the moon's longitude and latitude, data for the libration of the moon, the obliquity of the ecliptic, the equation of the equinoxes, etc.

### TIME.

Astronomers make use of two different kinds of time; mean solar time, which is to be distinguished from true, or apparent solar time; and sidereal time.

*Solar Time.*—Solar time is that used for all the purposes of ordinary life, and is measured by the daily motion of the sun. A *Solar Day* is the interval of time between two successive transits of the sun over the same meridian; and the hour-angle of the sun is called *Solar Time*. This is the most natural and direct measure of time. But the intervals between the successive returns of the sun to the same meridian are not exactly equal, owing to the varying motion of the earth around the sun, and to the obliquity of the ecliptic. The intervals between the sun's transits over the meridian being unequal it is impossible to regulate a clock or chronometer so that it shall accurately follow the sun.

To avoid the irregularity which would arise from using the true sun as the measure of time, a fictitious sun, called the *Mean Sun*, is supposed to move in the equator with a uniform velocity. This mean sun is supposed to keep, on the average, as near the real sun as is consistent with perfect uniformity of motion; it is sometimes in advance of it, and sometimes behind it, the greatest deviation being about 16 minutes of time.

*Mean Solar Time*, which is perfectly equable in its increase, is measured by the motion of this mean sun. The clocks in ordinary use and the chronometers used by navigators are regulated to mean solar time.

*True, or Apparent Solar Time* is measured by the motion of the real sun.

The difference between apparent and mean time is called the *Equation of Time*. By means of it, we change apparent to mean time, or the reverse. Thus, if the apparent time be given, the mean time corresponding to it will be obtained by adding or subtracting the equation of time, according to the precept at the head of the column in which it is found, on page I of the Calendar for each month. If the mean time be given, the apparent time is obtained by applying the equation of time as directed by the precept on page II of the Calendar.

*Sidereal Time.*—Sidereal time is measured by the daily motion of the stars; or, as it is used by astronomers, by the daily motion of that point in the equator from which the true right ascension of the stars is counted. This point is the vernal equinox, and its hour-angle is called *Sidereal Time*. Astronomical clocks, regulated to sidereal time, are called sidereal clocks.

A *Sidereal Day* is the interval of time between the transit of the vernal equinox over the meridian, and its next succeeding return to the same meridian. It is about  $3^m\ 56^s$  shorter than the mean solar day;  $365\frac{1}{4}$  solar days, or a year, being divided into  $366\frac{1}{4}$  sidereal days.

It is divided into 24 hours. The sidereal hours are counted from 0 to 24, commencing with the instant of the passage of the true vernal equinox over the upper meridian, and ending with its return to the same meridian. About March 21st of each year the sidereal clock agrees with the mean time, or ordinary clock, and the former gains on the latter about  $3^m 56^s$  per day, so that at the end of a year it will have gained an entire day, and will again agree with the mean time clock.

*Day.*—The *Civil Day*, according to the customs of society, commences at midnight, and comprises twenty-four hours, from one midnight to the next following. The hours are counted from 0 to 12 from midnight to noon, after which they are again reckoned from 0 to 12 from noon to midnight. Thus the day is divided into two periods of 12 hours each, of which the first is marked A. M., and the last is marked P. M.

The *Astronomical Day* begins at noon on the civil day of the same date. It also comprises twenty-four hours, but they are reckoned from 0 to 24, and from the noon of one day to that of the next following. The astronomical as well as the civil time may be either apparent or mean, according as it is reckoned from apparent noon or from mean noon.

The civil day begins twelve hours before the astronomical day; therefore the first period of the civil day answers to the last part of the preceding astronomical day, and the last period of the civil day corresponds to the first part of the same astronomical day. Thus, January 9th, 2 o'clock, A. M., civil time, is January 8th, 14<sup>h</sup>, astronomical time; and January 9th, 2 o'clock, P. M., civil time, is also January 9th, 2<sup>h</sup>, astronomical time. The rule, then, for the transformation of civil time into astronomical time is this: *If the civil time is marked A. M., take one from the day and add twelve to the hours, and the result is the astronomical time wanted; if the civil time is marked P. M., take away the designation P. M., and the astronomical time is had without further change.*

*To change astronomical to civil time, we simply write P. M. after it, if it is less than 12 hours. If greater than 12 hours, we subtract 12 hours from it, add 1 to the days, and write A. M.* For example, January 3d, 23 hours, astronomical time, is January 4th, 11 o'clock, A. M., civil time.

If the longitude from Greenwich be expressed in time, and, when *west*, added to the local time, or, when *east*, subtracted from the local time, the result is the corresponding Greenwich time. If the local mean time is used, the result is the Greenwich mean time, which ordinarily is that required for the use of this Ephemeris. The rule is the same, whether we use mean or sidereal time.

### THE CALENDAR.

The Calendar is divided into twelve months, and to each month are assigned eighteen pages, the contents of which are as follow:—

Page I contains, for Greenwich apparent noon of each day, *The Sun's Apparent Right Ascension and Declination*, and the *Equation of Time*. Adjoining columns contain the differences of these quantities for one hour. By multiplying this difference by the hours and parts of an hour from Greenwich apparent noon, and adding the amount to, or subtracting it from, the quantity at noon, according as that quantity is increasing or decreasing, we obtain the value of any quantity for any given Greenwich apparent time. The hourly differences are given for the instant of apparent noon at Greenwich, and, when greater accuracy is required, should be first interpolated for half the hours and parts of an hour of the Greenwich apparent time.

This page is chiefly used when the sun is observed on the meridian, and the local apparent time is  $0^h 0^m 0^s$ . The longitude from Greenwich expressed in time, if *west*, is at that instant the Greenwich apparent time, or time after Greenwich apparent noon; if *east*, it is time before Greenwich apparent noon. The longitude of any place is therefore employed in reducing the quantities on this page to apparent noon at the place.

The right ascension of the sun thus reduced is the sidereal time of local apparent noon. The difference between it and the clock time of the meridian passage of the sun is the error of the clock on sidereal time.

The declination of the sun reduced to the meridian, or apparent noon, of the place, is required in finding the latitude from a meridian altitude of the sun.

As an example of the use of page I:—

Let the sun's declination be required at apparent noon, 1898, May 27, at a place whose longitude is  $179^{\circ} 40'$ , or  $11^{\text{h}} 58^{\text{m}} 40^{\text{s}}$  east from Greenwich:

Local apparent time . . . . .	May 27,	<sup>h</sup> <sup>m</sup> <sup>s</sup> 0 0 0
Longitude from Greenwich (subtractive) . . . . .		11 58 40
Greenwich apparent time . . . . .	May 26,	12 1 20

Reducing the minutes and seconds to decimals of an hour, we find that this moment is  $12^{\text{h}}.022$  after Greenwich apparent noon on May 26, or  $11^{\text{h}}.978$  before Greenwich apparent noon on May 27.

On page 74 of the Ephemeris we find that the change of declination in one hour is

May 26, at Greenwich apparent noon . . . . .	+ 25.76
May 27, at Greenwich apparent noon . . . . .	+ 24.84
Difference for one day . . . . .	0.92

If we want to be very exact, we find the amount of this hourly difference for the time which is half way between Greenwich noon and the time of observation; that is, for 6 hours after Greenwich noon of the 26th, this being half of 12 hours. Six hours is 0.25 of a day; so the calculation is as follows:—

Difference for one hour, May 26 . . . . .	25.76
Change for 0.25 of a day or $0''.92 \times 0.25$ . . . . .	— 0.23
Difference at 6 hours after noon . . . . .	25.53
$25''.53 \times 12.022 = 306''.9 = 5' 6''.9$	
Declination at Greenwich noon, May 26 . . . . .	N. 21 10 53.8
Change in 12.022 hours (additive) . . . . .	5 6.9
Sun's declination at time of observation . . . . .	N. 21 16 0.7

When the time of observation is only a few hours before Greenwich noon, it may be better to count the longitude backward from this nearest noon. Thus, in the example just given, the time is  $11^{\text{h}}.978$  before Greenwich noon of May 27; half this interval is about 0.25 of a day, and the hourly motion for the middle of the interval is  $25''.07$ . Then, we find:—

Declination at Greenwich noon, May 27 . . . . .	N. 21 21 1.0
Product of $25''.07 \times 11.978 = 300''.3$ (subtractive) . . . . .	5 0.3
Sun's declination at time of observation . . . . .	N. 21 16 0.7

It will always be well to make the calculation by both methods, as their agreement will show both to be right.

At sea it is ordinarily sufficient to have the declination to the nearest half minute, and the reduction may be found by Table 12 of BOWDITCH'S *American Practical Navigator*.

The equation of time, as has been before explained, is the number of minutes and seconds to be added to or subtracted from the apparent time, or the time given by an observation of the sun, to obtain the mean time. The heading of the column directs the manner in which the equation is to be applied. When there is a change in the course of the month from addition to subtraction or the reverse (as in the months of April and June), the two different directions are separated by a line, while a corresponding line below points out the dates between which the change takes place. The equation of time, as given on page I, is the mean time of apparent noon, or the hour-angle of the mean sun at that instant.

*The Sun's Semidiameter* and the *Sidereal Time of Semidiameter Passing Meridian* are also given on page I. The sun's semidiameter is used in reducing the altitude of the upper or lower limb of the sun to the altitude of the center; and in reducing the angular distance of the limb from the moon or some other object, to the distance from the center of the sun. The sidereal time of semidiameter passing the meridian is employed in obtaining the passage of the sun's center over the wires of a transit-instrument, when the passage of one limb only has been observed. The quantity found in this column is to be added to the time of transit of the first, or western, limb; and to be subtracted from the time of transit of the second, or eastern, limb.

Page II contains, for Greenwich mean noon of each day, *The Sun's Apparent Right Ascension* and *Declination*, the *Equation of Time*, and the *Sidereal Time of Mean Noon*. The hourly changes of these quantities are also given, and may be used in reducing them to any Greenwich mean time. The hourly changes may be first interpolated for half the Greenwich time, when great precision is required, in the way described in explaining the calculation of the declination.

The right ascension and declination on pages I and II are affected by aberration, and therefore denote the *apparent* position of the *true* sun. Page II is more conveniently used when the mean time is known. This is the case in most observations of the sun out of the meridian, when the times have been noted by a clock or chronometer regulated to mean time. The quantities on this page can be reduced to mean noon of any place by interpolating for the longitude, as in the example of the sun's declination on the preceding page.

The sun's declination is required in finding the latitude of the place, the local time, and the sun's azimuth and amplitude, from observations of the sun.

The equation of time is needed in finding the mean time from observations of the sun, and the latitude from observations out of the meridian. The heading of the column directs the manner in which it is to be applied to mean time to obtain the apparent time.

The equation of time, as given on page II, is the apparent time of mean noon; and is equivalent to the hour-angle of the true sun at the instant of mean noon.

The sidereal time of mean noon is also the right ascension of the mean sun at Greenwich mean noon. It may be reduced for the longitude, or to any Greenwich mean time, by using the hourly difference,  $9^{\text{s}}.8565$ ; or by Table III, appended to this volume, for reducing intervals of mean solar to sidereal time. Table 9 of BOWDITCH'S *Navigator* may be used for the same purpose.

The sun's right ascension and the sidereal time of mean noon, or right ascension of the mean sun, are useful in converting mean time to sidereal time. We first find the Greenwich mean time, then the R. A. of the mean sun for this time, as last explained; this being added to the local mean time will give the sidereal time.

The sidereal time of mean noon, reduced for the longitude of the place, is also used in converting sidereal time to mean time. Subtracting the reduced value from the given sidereal time, gives the interval of sidereal time from noon. Subtracting from this the corresponding reduction of a sidereal interval to a mean time interval, in Table II, appended to this volume, or Table 8 of BOWDITCH'S *Navigator*, will give the mean time required. This reduction may also be found by multiplying  $9^{\text{s}}.8296$  by the hours and parts of an hour of the given sidereal time.

As examples of the use of page II:—

1.—Let the sun's right ascension and the equation of time be required for 1898, May 22,  $9^{\text{h}} 2^{\text{m}} 30^{\text{s}}$ , A. M., mean time, at a place whose longitude is  $100^{\circ} 10'$ , or  $6^{\text{h}} 40^{\text{m}} 40^{\text{s}}$ , west of Greenwich.

Local astronomical mean time	May 21,	$\begin{array}{r} \text{h} \quad \text{m} \quad \text{s} \\ 21 \quad 2 \quad 30 \end{array}$
Longitude from Greenwich (additive)		$\underline{6 \quad 40 \quad 40}$
Greenwich mean time	May 22,	$3 \quad 43 \quad 10 = 3^{\text{h}}.7194$



*Sun's Right Ascension.*

	h	m	s
May 22, Greenwich noon	3	56	59.08
H. D. $10^{\circ}.046 \times 3.7194$	+	0	37.36
	3	57	36.44

*Equation of Time.*

	m	s
May 22, noon	3	33.11 (additive)
H. D. $-0^{\circ}.189 \times 3.72$	-	0.70
	3	32.41

In this case, the hourly differences interpolated to half the interval, or  $1^{\text{h}}.9$  after noon, have been used.

The equation of time in this example is additive to mean time. Its reduction could also have been found by Table 12 of BOWDITCH'S *Navigator*.

2.—If the sidereal time is required for the same date and time, we have:—

	h	m	s
May 22, Sidereal Time (at Greenwich mean noon)	4	0	32.19
Hourly difference $9^{\circ}.8565 \times 3.7194$	+		36.66
Add the local astronomical mean time	21	2	30.00
The required sidereal time is (rejecting $24^{\text{h}}$ )	1	3	38.85

The reduction  $0^{\text{m}} 36.66$  could have been found in Table III corresponding to the Greenwich mean time  $3^{\text{h}} 43^{\text{m}} 10^{\text{s}}$  or by Table 9 of BOWDITCH'S *Navigator*.

3.—On 1898, May 22, A. M., at a place whose longitude is  $100^{\circ} 10' \text{ W.}$ , suppose the sidereal time to be  $1^{\text{h}} 3^{\text{m}} 38.85$ , and that the corresponding mean time is required.

The astronomical day is May 21; the longitude in time,  $+ 6^{\text{h}} 40^{\text{m}} 40^{\text{s}}$ , or  $+ 6^{\text{h}}.678$ .

	h	m	s
May 21, Sidereal Time (at Greenwich mean noon)	3	56	35.63
The H. D. $9^{\circ}.8565 \times 6.678$ , or the reduction for $6^{\text{h}} 40^{\text{m}} 40^{\text{s}}$ in Table III	+	1	5.82
The sidereal time of local mean noon	3	57	41.45
The given sidereal time ( $+ 24^{\text{h}}$ , if necessary for the following subtraction)	25	3	38.85
Subtracting the first from the second gives the sidereal interval from noon	21	5	57.40 = $21^{\text{h}}.0993$
$- 9^{\circ}.8296 \times 21.0993$ or the reduction for $21^{\text{h}} 5^{\text{m}} 57.4$ in Table II	-	3	27.40
The required astronomical mean time is	May 21,	21	2 30.00

Page III contains, for Greenwich mean noon of each day, *The Sun's True Longitude and Latitude*, and the *Logarithm of the Radius Vector of the Earth*. The longitudes of the sun are the true geometric longitudes, not corrected for aberration. The longitude is given in two columns, headed  $\lambda$  and  $\lambda'$ ;  $\lambda$  representing the sun's longitude counted from the true equinox of the date; and  $\lambda'$ , the same co-ordinate counted from the mean equinox of the beginning of the year, (January  $0^{\text{d}}.0$ ). A column of hourly differences enables the computer to obtain the sun's longitude for any hour from noon. The hourly differences of the logarithm of the radius vector are likewise given. The latitude is referred to the ecliptic of the date.

The last column on page III contains the *Mean Time of Sidereal Noon*; that is, the number of hours, minutes and seconds after Greenwich mean noon when the first point of Aries passes the meridian of Greenwich. It may be reduced to any meridian by interpolating for the longitude, or to any Greenwich sidereal time by means of the hourly difference,  $-9^{\circ}.8296$ . The reduction, however, can be taken directly from Table II for reducing intervals of sidereal time to mean solar time; or from Table 8 of BOWDITCH'S *Navigator*.

This column may be used in converting sidereal time to mean time instead of that on page II. As an illustration, let us take Example 3, above.

It is seen in advance that the sum of the mean time of sidereal noon and the given sidereal time is less than 24 hours. Were it more than 24 hours, the mean time of sidereal noon should be taken out for May 20, that is the preceding astronomical day.

	h	m	s
May 21, the mean time of Greenwich sidereal noon is	20	0	7.22
The H. D. $-9^{\circ}.8296 \times 6.678$ , or the reduction for longitude, Table II	-	1	5.64
The mean time of local sidereal noon	19	59	1.58
Add the given sidereal time	1	3	38.85 = $1^{\text{h}}.0608$
The sum is	21	2	40.43
$- 9^{\circ}.8296 \times 1.0608$ , or the reduction for $1^{\text{h}} 3^{\text{m}} 38.85$ in Table II	-	0	10.43
The required astronomical mean time	May 21,	21	2 30.00

Page IV contains *The Moon's Semidiameter* and *Equatorial Horizontal Parallax*, for each mean noon and midnight at Greenwich. Columns adjoining those of the horizontal parallax give the change of this quantity in one hour, by means of which it can be reduced to any other Greenwich mean time, in the same way as the sun's declination and the equation of time in the preceding examples. The sign plus or minus prefixed to the hourly differences, shows whether the horizontal parallax is increasing or decreasing.

The reduction of the moon's semidiameter may be readily found by multiplying the reduction of the horizontal parallax by 0.272, or by simply computing the proportional part.

If, for example, the semidiameter of the moon is to be taken out for 1898, January 25, 10<sup>h</sup>, P. M., Greenwich mean time, we see that the difference of the semidiameters at noon and midnight of January 25 is 7".3; then,

$$12^h : 10^h = 7''.3 : 6''.1,$$

which is the correction to be subtracted from the semidiameter at noon, because the semidiameter is decreasing. The moon's semidiameter then, for January 25, 10<sup>h</sup>, is 15' 40".7.

The moon's semidiameter and horizontal parallax are required for all observations of the moon. When great precision is needed, the hourly differences should be first interpolated for half the interval of Greenwich time from noon or midnight, and a correction applied to the horizontal parallax for the latitude of the place of observation.

The *Mean Time of the Moon's Upper Transit at Greenwich*, which is given on page IV to tenths of a minute, is also accompanied with a column of differences for one hour of longitude, by means of which, having the longitude converted into time, the local time of the moon's meridian passage at any other place may be computed. The reduction may be taken by simple inspection from BOWDITCH'S Table 11. The last column of this page contains the *Age* of the moon, or the time elapsed since the preceding new moon, to tenths of a day.

Pages V—XII contain *The Moon's Right Ascension* and *Declination*, for each day and hour of Greenwich mean time. They are accompanied with columns of differences for one minute, which are also given at each hour. The Greenwich mean time, which is required for taking out these quantities, may be taken from a well-regulated chronometer, or obtained by applying the longitude converted into time, to the local mean time of the observer. The right ascension or declination is taken out for the day and hour of the Greenwich mean time; the *Diff. for 1 Minute* multiplied by the minutes and parts of a minute of the Greenwich time, and the product added to, or subtracted from the quantity, according as the quantity is increasing or decreasing.

Thus, suppose the moon's right ascension and declination are required for 1898, August 3, 10<sup>h</sup> 10<sup>m</sup> 30<sup>s</sup>, astronomical mean time at Greenwich:—

<i>Right Ascension.</i>			<i>Declination.</i>		
	<i>h</i>	<i>m</i>	<i>s</i>		
August 3, 10 <sup>h</sup>	22	22	51.67	S.	5 56 46.3
Diff. 2 <sup>d</sup> .1977 × 10.5	= + 23.08			15".186 × 10.5 =	+ 2 39.5
August 3, 10 <sup>h</sup> 10 <sup>m</sup> 30 <sup>s</sup>	22	23	14.75	S.	5 54 6.8

The differences interpolated for 5<sup>m</sup>.2 = 0<sup>h</sup>.09 are, for the right ascension 2<sup>d</sup>.1977, and for the declination 15".186, which have been used for greater precision.

Page XII contains also the *Phases of the Moon* and the dates of the *Moon's Perigee and Apogee*, or least and greatest distances from the earth.

Pages XIII—XVIII contain the *Lunar Distances*, or the angular distances of the centre of the moon from the centre of the sun, and from the four larger planets and certain fixed stars, as they would appear to an observer at the centre of the earth. They are given for every third hour of Greenwich mean time, beginning at noon; the dates are therefore astronomical. All the distances that can be observed on the same day, are grouped together under that date; and the columns are read from left to right, across both pages of the same opening. The letter W. or E. is affixed to the name of the sun, planet or star, to indicate that it is on the west, or east side of the moon.

An observer on the earth's surface having measured a lunar distance, corrected it for errors of his instrument and for the semidiameter of the objects, and cleared it from the effects of refraction and parallax, finds the true or geocentric distance, that is, the distance as it would have appeared from the centre of the earth at the moment of observation. With this distance and the distances in the Ephemeris of the same bodies on the same day, the Greenwich mean time of the observation can be found.

To lessen the labor of computation, there is given in the Ephemeris, between every two successive distances, the logarithm of the seconds of time in which the distance changes 1"; or, as it is usually called, the *Proportional Logarithm of the Difference*. It is given for the middle instant of the two hours between which it is placed.

For computing the Greenwich time we have the following rule:—

*Find in the Almanac the two distances between which the true distance falls; take out the nearer of these, the hours of Greenwich time over it, and the P. L. of Diff. between them.*

*Find the difference between the true distance and the distance taken from the Almanac; and from the proportional logarithm of this difference, as found in the Navigator (Table 45), subtract the P. L. of Diff. taken from the Almanac.*

*The result is the proportional logarithm of an interval of time to be added to the hours of Greenwich time, taken from the Almanac, when the earlier Almanac-distance is used; to be subtracted from the hours of Greenwich time, when the later Almanac-distance is used.*

Another method is, to add the common logarithm of the difference of the true and the Almanac-distances to the P. L. of Diff. of the Almanac; the sum will be the common logarithm of the correction to be applied to the hours of Greenwich time. Table 34 of BOWDITCH'S *Navigator* saves the operation of reducing degrees (or hours) and minutes to seconds, and the reverse.

As the P. L. of Diff. in the Ephemeris varies, the Greenwich time found by the methods just described may not be sufficiently exact. To correct it for such variation, or second difference, take the difference between the P. L. of Diff. used and the one which follows it in the Ephemeris, (or, more strictly, half the difference of the preceding and following ones). With this difference, and the first correction of the Greenwich time already found, enter Table I, appended to this volume, and take out the corresponding seconds, which are to be added to the approximate Greenwich time when the Prop. Logs. in the Ephemeris are decreasing; and subtracted when they are increasing.

Thus the Greenwich mean time of the observation can be obtained. If the observer has noted the time of observation by a chronometer, the difference of this chronometer-time and the Greenwich mean time will be the error of the chronometer on Greenwich time as found from the lunar distance. In this way lunar distances can be used as a check upon the chronometer. By a series of carefully observed lunar distances on both sides of the moon, the chronometer-error may generally be ascertained within 20 or 30 seconds.

If the observer has found the local mean time of observation from the observed altitude of one of the bodies, or by a watch regulated to that time by recent observations and corrected for change of longitude in the interval, the difference of this local time and the Greenwich time found from the lunar distance will be his longitude. A longitude derived by this method should always be considered as uncertain by 5' or more.

As an example of finding the Greenwich mean time from a lunar distance, suppose that in 1898, January 1, the corrected distance of the moon's centre from that of Fomalhaut is  $65^{\circ} 47'$ :—

Corrected distance	.	.	.	.	.	65	47	0		
Distance in Ephemeris Jan. 1, VI <sup>h</sup>	.	.	.	.	.	65	8	32	P. L.	0.3501
Difference	.	.	.	.	.	0	38	28	P. L.	0.6702
									P. L.	0.3201
Time from VI <sup>h</sup> (after)	.	.	.	.	.	+	1	26	8	
Corr. for 2d Diff., Table I	.	.	.	.	.	+			1	
Greenwich mean time Jan. 1	.	.	.	.	.	.	7	26	9	

By a table of common logarithms, or a table of logarithms of small arcs, the reduction of the Greenwich time would be found thus:—

From Ephemeris	.	.	.	.	.	P. L.	0.3501
Diff. of distances, $38' 28'' = 2308''$	.	.	.	.	.	log	<u>3.3632</u>
Red. of Greenwich time, $5168'' = 1^{\circ} 26' 8''$	.	.	.	.	.	log	3.7133

The result is the same as by the previous method.

Pages 218—249 contain the geocentric ephemerides of the seven major planets. The positions are referred to the equator and true equinox of the date, and corrected for aberration; they are, therefore, apparent positions. All the data except meridian passage are given for the moment of Greenwich mean noon. The column *Meridian Passage* gives the hour, minute and tenth of that passage of the planet over the meridian of Greenwich which occurs next after the noon of the date.

The right ascension and declination of a planet are required whenever it has been observed for time, latitude or azimuth. The mode of reducing them to any instant of Greenwich mean time is the same as in the examples for the sun, previously given. The local mean time of passage across any other meridian can be found by dividing the daily differences by 24, and multiplying the quotient by the hours and fractions of the longitude of the place. The product is subtractive from the time of Greenwich passage when the place is east of Greenwich, and additive when west. The corrections can never exceed one-half the change for one day.

Pages 250—263 contain the heliocentric positions of the seven major planets, and the logarithms of their distances from the earth. The heliocentric longitude is reckoned, not from the true equinox, as in the preceding ephemerides, but from the mean equinox of the date. It is, therefore, necessary to apply nutation, if the longitude from the true equinox is required. The daily motion is given for the moment of Greenwich mean noon. The column *Reduction to Orbit* gives the correction to be applied to the heliocentric longitudes in order to obtain the longitude counted along the orbit of the planet. This longitude is equal to the distance of the node from the mean equinox, plus the distance of the planet from the node. The heliocentric latitude is counted from the moving plane of the ecliptic. The *Logarithm of Radius Vector* is the logarithm of the distance of the centre of the planet from that of the sun, at each Greenwich mean noon given in the first column. The two last columns give, in the same way, the logarithm of the true distance of the centre of the planet from that of the earth. The one column gives the quantity for the Greenwich noon indicated on the left hand side of the page, and the other for the noon which is midway between that date and the date next below it. In the case of Mercury, this intermediate date is mean noon of the day immediately following; in the case of Venus, Mars, Jupiter, and Saturn, it is mean noon of the second day following; and in the case of Uranus and Neptune, mean noon of the fourth day following.

Pages 264—271 contain the rectangular co-ordinates of the centre of the sun, referred to the centre of the earth as the origin, and to the true equator and equinox of each date as the circle and point of reference. Each co-ordinate is given first for Greenwich mean noon, and in the column following for mean midnight of the same day. The columns *Reduc. to Mean Eq'x of Jan. 0* give the corrections to be applied to the co-ordinates for noon in order to obtain the corresponding co-ordinates referred to the mean equator and the mean equinox of January 0.

Pages 272—275 give the longitude and latitude of the moon for every Greenwich mean noon and midnight. Both quantities are referred to the true ecliptic and equinox of the date.

Pages 276 and 277 contain the position of the moon's equator and the mean longitude of the moon, and a table for computing the libration of the moon. The epochs of greatest libration of the moon, together with the formulæ for finding the libration in longitude and latitude are given on page 419.

Page 278 contains, for each tenth Greenwich mean noon, the values of the principal elements arising from the motion of the equinox, and also the aberration and parallax of the sun. The column *Apparent Obliquity of the Ecliptic* (HANSEN) gives the true inclination of the earth's equator to the ecliptic, without correction for the terms depending on the moon's longitude. The *Equation of Equinoxes* (HANSEN) is really the astronomical nutation; that given *In Longitude* is the correction to be applied to the longitude of the body referred to the mean equinox, in order to obtain that longitude as referred to the true equinox. When the correction is positive, the true longitudes are greater than those referred to the mean equinox; while the contrary is true when the correction has the negative sign. The equation *In R. A.* is equal to that in longitude, multiplied by the cosine of the obliquity of the ecliptic.

The next column gives the *Precession of Equinoxes in Longitude*, from January 0 to each of the dates following. The *Sun's Aberration* is the quantity which is to be applied to the true longitude of the sun in order to obtain its apparent longitude. The correction being negative shows that the apparent longitude as affected by aberration is always less than the true longitude. The *Sun's Equatorial Horizontal Parallax*, given in the next column, is the angle subtended by the radius of the earth's equator, as seen from the centre of the sun.

## PART II—THE EPHEMERIS FOR THE MERIDIAN OF WASHINGTON.

Page 280 contains the formulæ for reducing the positions of the fixed stars, using the notation of BESSEL, and the constants of PETERS and STRUVE. The formulæ by which the star-numbers are computed are also given.

Pages 281—284 contain the logarithms of the *Besselian Star Numbers*, *A, B, C, D*, for each Washington mean midnight. These numbers serve to reduce the mean place of a star at the beginning of the Besselian fictitious year to its apparent place at the dates for which the numbers are given. If used in accordance with the English and French notation, the pair of quantities *A* and *B* must be interchanged with the pair *C* and *D*; that is, *A* must be interchanged with *C*, and *B* with *D*. In the first column along with the solar day is given, for certain dates, the sidereal hour of Washington mean midnight. The sidereal time for which any set of quantities is given can be found by interpolation from these numbers.

The following is an example of the reduction of a star to apparent place by the Besselian star-numbers:—

*Computation of the apparent place of  $\pi$  Aquarii for 1898, August 17, for the upper transit at Washington.*

(Page 283)	$\log a$	0.4862	$\log b$	6.9575	$\log c$	8.7812	$\log d$	8.4496 <i>n</i>
	$\log A$	9.9912	$\log B$	0.4520 <i>n</i>	$\log C$	1.1879	$\log D$	1.0663 <i>n</i>
	$\log a'$	1.2595	$\log b'$	9.6257	$\log c'$	9.6435	$\log d'$	8.1335
	$\log A a$	0.4774	$\log B b$	7.4095 <i>n</i>	$\log C c$	9.9691	$\log D d$	9.5159
	$\log A a'$	1.2507	$\log B b'$	0.0777 <i>n</i>	$\log C c'$	0.8314	$\log D d'$	9.1998 <i>n</i>

<i>Mean Place, 1898.0,</i>	$\alpha_0$	= 22 20 4.095	$\delta_0$	= 0 51 35.10
	$A a$	= + 3.002	$A a'$	= + 17.81
	$B b$	= - 0.003	$B b'$	= - 1.20
	$C c$	= + 0.931	$C c'$	= + 6.78
	$D d$	= + 0.328	$D d'$	= - 0.16
	$E$	= + 0.003	$\tau \mu'$	= 0.00
	$\tau \mu$	= 0.000		

<i>Apparent Place, August 17,</i>	$\alpha$	= 22 20 8.356	$\delta$	= 0 51 58.33
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Pages 285—292 contain the *Independent Star-Numbers*, which can be used for the same purpose. The column  $\tau$  gives the fraction of the year from the beginning of the fictitious year to each date. These quantities are connected with those of BESSEL by the relations given on page 280, where are also found the formulæ and precepts for the application of both systems of numbers. In order to use the Besselian numbers, it is necessary to have the values of the star-constants, *a, b, c, d, a', b', c', d'*. The independent star-numbers are

given in order that the apparent place of the star may be determined when it is not convenient to compute these numbers.

The following is an example of the reduction of a star to apparent place by the independent star-numbers:—

*Computation of the apparent place of  $\pi$  Aquarii for 1898, August 17, for the upper transit at Washington.*

$a_0 = 335^\circ \text{ i}$		$\delta_0 = + 0^\circ 52'$	
$G = 351^\circ 48'$		$G + a_0 = 326^\circ 49'$	
$H = 127^\circ 7'$		$H + a_0 = 102^\circ 8'$	
$\log \frac{1}{r}$	8.8239	$\log \frac{1}{r}$	8.8239
$\log g$	1.2979	$\log h$	1.2860
$\log \sin (G + a_0)$	9.7382 $\pi$	$\log \sin (H + a_0)$	9.9902
$\log \tan \delta_0$	8.1798	$\log \sec \delta_0$	0.0000
$\log (g)$	8.0398 $\pi$	$\log (h)$	0.1001
		<i>Apparent R. A.,</i>	
$\log g$	1.2979	$\log h$	1.2860
$\log \cos (G + a_0)$	9.9227	$\log \cos (H + a_0)$	9.3226 $\pi$
$\log (g')$	1.2206	$\log \sin \delta_0$	8.1797
		$\log (h')$	8.7883 $\pi$
$\log i$	0.8255		
$\log \cos \delta_0$	0.0000		
$\log (i)$	0.8255		

$a_0 =$	$\begin{matrix} h & m & s \\ 22 & 20 & 4.095 \end{matrix}$
$f =$	$\begin{matrix} + & 3.015 \end{matrix}$
$(g) =$	$\begin{matrix} - & 0.011 \end{matrix}$
$(h) =$	$\begin{matrix} + & 1.259 \end{matrix}$
$\tau \mu =$	0.000
<i>Apparent R. A.,</i>	
$a =$	$\begin{matrix} 22 & 20 & 8.358 \end{matrix}$
$\delta_0 =$	$\begin{matrix} 0^\circ & 51' & 35.10 \end{matrix}$
$(g') =$	$\begin{matrix} + & 16.62 \end{matrix}$
$(h') =$	$\begin{matrix} - & 0.06 \end{matrix}$
$(i) =$	$\begin{matrix} + & 6.69 \end{matrix}$
$\tau \mu' =$	0.00
<i>Apparent Dec.</i>	
$\delta =$	$\begin{matrix} 0^\circ & 51' & 58.35 \end{matrix}$

Pages 293—301 contain the mean places of three hundred and eighty-three stars, for the beginning of the fictitious year 1898, or the moment when the sun's mean longitude is  $280^\circ$ .

The annual variations are to be considered as the differential coefficients of each co-ordinate with respect to the time at the beginning of the year.

In order that the list of mean places of stars may serve the purpose of a working-catalogue for the convenient use of astronomers, the position of each of the northern circumpolar stars is given in duplicate, one position being for the upper and the other for the lower culmination. The positions for the lower culmination are marked S. P. In this case, the right ascensions are the sidereal times at which the star crosses the lower meridian; and, in order to have the expressions for the co-ordinates congruous in all cases, the declinations are counted from the equator through the north pole, and therefore exceed  $90^\circ$ . The time of observation and the setting of the circle, in order to find a star on the meridian, are then obtained uniformly for all the stars.

Beginning with the volume of 1882, the number of stars has been greatly increased, in order to make the list more useful to field-astronomers. To show at a glance these additional stars, they are indicated in the list by an asterisk.

Pages 302—313 contain the apparent positions of the four north polar stars,  $\alpha$ ,  $\delta$  and  $\lambda$  Ursæ Minoris, and  $\gamma$  Cephei, for every upper transit at Washington. They include the terms depending on the moon's longitude. The mean solar time of transit is given in the column *Mean Solar Date*, in order that each transit above and below the pole may be readily identified. Suppose, for example, that the transit of Polaris below the pole on January 26th is to be found, and we wish to know whether it precedes or follows the upper transit of the same date. On page 302, we find that the upper transit occurs January 26.2; the lower transit, therefore, occurs January 26.7. But, the lower transit following that of July 1st (page 308), does not take place until July 2.3. Hence, the lower transit of July 1st precedes the upper one of the same date. A transit occurring very nearly at noon may also be identified without a computation to ascertain the actual mean date, by simply noting the tenth of a day in the column of *Mean Solar Date*.

Pages 314—364 contain, for every tenth upper transit at Washington, the apparent places of those stars of the preceding list which are not marked with an asterisk. The mean solar

date in each left hand column gives the day and tenth of the transit; so that each intermediate transit may be readily identified. Along with each co-ordinate is given, in small type, the change for ten days. This quantity is to be regarded as the differential coefficient corresponding to the dates for which the star-places are given.

Pages 365—376 contain the apparent right ascensions of all stars marked with an asterisk in the list of mean places. The apparent right ascension of each star is given only for that part of the year when it may readily be observed on the meridian. In the case of circumpolar stars, the right ascensions for lower, as well as upper, transit are given.

Pages 377—384 contain the apparent right ascension, declination, and semidiameter of the sun, and the sidereal time, all for Washington mean noon. Adjoining columns give the seconds of right ascension and of declination for apparent noon, that is, for the moment of transit of the sun's centre over the meridian of Washington. The hours and minutes of right ascension, and the degrees and minutes of declination are the same for both mean and apparent noon. In case they would have differed, the minute which would have been numerically larger is diminished by one, and the seconds increased by sixty, so that there is always a correspondence between the two numbers. The hourly motions in right ascension and declination are given for the moment of mean noon, but may be regarded as having the same values for apparent noon.

The *Equation of Time for Apparent Noon* is the correction to be applied to apparent time in order to obtain mean time. It is, therefore, mean time minus apparent time. Each number as given is the mean time of transit of the sun's centre over the meridian of Washington, counted from the nearest noon. The use of all the quantities is substantially the same as in the *Ephemeris for the Meridian of Greenwich*.

Pages 385—392 contain the right ascension, declination, semidiameter, and parallax of the moon, at the moment of transit over the meridian of Washington. The mean time given in the second column is that of transit of the moon's centre over this meridian. The differences for one hour of longitude are the amounts by which the local mean times of transit over a meridian one hour west of Washington exceed those given in the column *Mean Time of Transit*, supposing the rate of change to be uniform and equal to what it is at the moment of transit over the meridian of Washington. The next four columns need no especial explanation, except that the differences for one hour of longitude are computed as if the motion of the moon in right ascension were uniform. By means of them, the position of the moon can be computed with astronomical accuracy at the moment of transit over any meridian not exceeding one hour in longitude from that of Washington, by taking account of second differences. With greater longitudes of the place, the accuracy of the result obtained in this way will diminish. The columns of sidereal time of semidiameter passing meridian, etc., do not seem to need any explanation, except that they all refer to the moment of transit. The column *Bright Limbs* is given to indicate to the observer which limbs are illuminated. When two opposite limbs are both so nearly full that they can be well observed, both are indicated.

Pages 393—409 contain the geocentric apparent right ascensions and declinations of the seven major planets, and their semidiameters and horizontal parallaxes, for the moments of all those transits over the meridian of Washington which can be observed.

### PART III—PHENOMENA.

This part gives the principal astronomical phenomena of the year, reduced to Washington mean time, except in the case of the eclipses and the data for the rings of Saturn, which are given in Greenwich mean time.

Pages 412—418 inclusive contain the elements necessary for computing the eclipses of the sun which occur during the year.

The eclipse-elements are given for the moment of conjunction of the sun and moon in right ascension. The subsequent tables and results are not, however, computed from these elements unchanged; but from the accurate positions of the two bodies as interpolated for each hour of the eclipse. The principal circumstances of each eclipse are as follows:—

On the line "Eclipse begins" is given the Greenwich mean time at which the earth first touches the moon's penumbra, and the longitude and latitude of the point of touching.

The "Central eclipse begins" when the axis of the moon's shadow first touches the earth, and the longitude and latitude of the point of touching follow.

"Central eclipse at noon" indicates the moment when the axis of the shadow is coincident with the plane of the meridian at the point of its intersection with the earth's surface. To the observer at this point the eclipse will be central at the moment of apparent noon.

"Central eclipse ends" and "Eclipse ends" have the converse meaning of the beginning.

*Maps of the Eclipses.*—The regions in which each eclipse is visible, are shown upon the maps given in connection with them. From these maps may also be derived the approximate determination of the times of beginning and ending, and of the magnitude of the eclipses at any place. The dotted curves show the outlines of the shadow for each hour of Greenwich mean time and therefore pass through all the places where the eclipse begins or ends at that hour. To find at what hour the eclipse begins at any place, we determine by inspection between what pair of these curved lines the place is situated. The eclipse will then begin between these two hours of Greenwich mean time: the fraction of the hour may be determined by dividing the hour proportionally to the space which it represents on the map. This division may be a little more exact by allowing for the changes in this space as indicated by their varying width. The Greenwich mean time thus found must be reduced to local mean time by applying the longitude.

As an example, suppose we wish to find the time at which the eclipse of 1898, January 21, begins and ends at Teheran.

For the beginning we compare the distance of the place from the curves of 18<sup>h</sup> and 19<sup>h</sup> and we find it to correspond to about 12 minutes from the former, therefore the time of beginning is approximately 18<sup>h</sup> 12<sup>m</sup>; for the end we compare the distance of the place from the curves of 20<sup>h</sup> and 21<sup>h</sup> and find it to be about 28 minutes from the former, therefore the approximate time of end is 20<sup>h</sup> 28<sup>m</sup>, both of which are probably correct to within 2 or 3 minutes. Changing to local mean time the result will be:—

		<i>Beginning.</i>			<i>Ending.</i>		
		d	h	m	d	h	m
Greenwich mean time	January	21	18	12	21	20	28
Longitude east			3	25		3	25
Local mean time	January	21	21	37	21	23	53

In the case of total and annular eclipses, a rough estimate of the magnitude of the eclipse may be obtained from the position of the place relatively to the central line and to the limit. On the central line, the eclipse is annular or total, while on the limit, the limb of the moon only grazes that of the sun.

*More Accurate Computations.*—A more accurate determination of the phases as visible at any point of the earth's surface may be obtained from the Besselian elements which are given for every ten minutes of Greenwich mean time. Their geometric signification is as follows:—

Let us imagine a plane passing through the centre of the earth, perpendicular to the right line joining the centres of the sun and moon. This latter line is the axis of the moon's shadow, and the plane is called the *fundamental plane*. We take the intersection of this plane with that of the earth's equator as the axis of *X*, and the centre of the earth as the origin of co-ordinates. The axis of *Y* is perpendicular to that of *X*, and directed toward the north; *x* and *y* are then the co-ordinates of the point in which the axis of the shadow intersects the fundamental plane. The angle *d*, of which the sine and cosine are both given, is the declination of that point of the celestial sphere toward which the axis of the



shadow is directed; this direction being that from the earth toward the moon and sun. The angle  $\mu$  is the Greenwich hour-angle of this same point of the celestial sphere.

The quantities  $l$  and  $l'$  are the radii of the shadow-cones upon the fundamental plane,  $l$  corresponding to the penumbra, and  $l'$  to the umbra, or annulus. The notation is that of CHAUVENET'S *Spherical and Practical Astronomy*, in which  $l'$  is regarded as positive for an annular, and negative for a total eclipse.

The angles  $f$  and  $f'$ , the tangents of which are given, are the angles which the elements of the respective shadow-cones make with the axis of the shadow; or, they are the semi-angles of the two cones.

At the bottom of the table are given the logarithms of the change of  $x$ ,  $y$  and  $\mu$ , in one minute, in order to facilitate the interpolation to any required moment.

The method of computing the eclipse from the given elements is as follows: It is premised that the moments of beginning and ending are those at which the distance of the observer from the axis of the shadow or penumbra is equal to the radius of the latter at the point of observation. To find such distance and radius we compute—

(1) The co-ordinates,  $\xi$ ,  $\eta$  and  $\zeta$ , of the observer, at some assumed moment of Greenwich mean time, as near as practicable to the true time of the required phase, together with their variations for one minute.

(2) The co-ordinates  $x$  and  $y$  of the axis of the shadow at the same moment, which, with their variations for one minute, are taken from the tables of elements.

(3) Hence, the position and motion of the observer relative to the axis of the shadow.

(4) The radius of the penumbra or umbra at a distance from the fundamental plane equal to that of the observer.

(5) Then, assuming the motions to be uniform, we determine the time required for the observer to be brought to a distance from the axis of the shadow equal to this radius.

The formulæ and directions for the several steps in the computation are as follow:—

(1) Find the geocentric co-ordinates of the station referred to the earth's equator, which are represented by  $\rho \cos \varphi'$  and  $\rho \sin \varphi'$ ,  $\rho$  being the distance from the centre of the earth, and  $\varphi'$  the geocentric latitude. These may be obtained from geodetic tables, or may be computed from the following table by the formulæ—

$$\rho \cos \varphi' = F \cos \varphi$$

$$\rho \sin \varphi' = \frac{\sin \varphi}{G}$$

$\varphi$  being, as usual, the geographic latitude.

Table for Computing the Geocentric Co-ordinates of a Place.

$\varphi$	LOG F.	LOG G.
0°	0.00000	0.00295
5	0.00001	0.00294
10	0.00004	0.00291
15	0.00010	0.00285
20	0.00017	0.00278
25	0.00026	0.00269
30	0.00037	0.00258
35	0.00048	0.00247
40	0.00061	0.00234
45	0.00074	0.00221
50	0.00086	0.00209
55	0.00099	0.00196
60	0.00111	0.00184
65	0.00121	0.00174
70	0.00130	0.00165
75	0.00138	0.00157
80	0.00143	0.00152
85	0.00146	0.00149
90	0.00147	0.00147

For the assumed Greenwich mean time of computation, take from the table of elements the values of  $\sin d$ ,  $\cos d$ , and  $\mu$ . Put:

$\lambda$ , the longitude west from Greenwich. The co-ordinates of the observer will then be:—

$$\begin{aligned}\xi &= \rho \cos \phi' \sin (\mu - \lambda) \\ \eta &= \rho \sin \phi' \cos d - \rho \cos \phi' \sin d \cos (\mu - \lambda) \\ \zeta &= \rho \sin \phi' \sin d + \rho \cos \phi' \cos d \cos (\mu - \lambda)\end{aligned}$$

and their variations in one minute of mean time will be:—

$$\begin{aligned}\xi' &= [7.63992] \rho \cos \phi' \cos (\mu - \lambda) \\ \eta' &= [7.63992] \rho \cos \phi' \sin d \sin (\mu - \lambda) = [7.63992] \xi \sin d \\ \zeta' &\text{ is not needed.}\end{aligned}$$

(2) The co-ordinates  $x$  and  $y$  of the axis of the shadow are taken from the tables of elements for the same assumed moment of Greenwich mean time, together with their variations for one minute, which are equal to one-tenth of the differences of two consecutive numbers. The variations for one minute are represented by  $x'$  and  $y'$ . Their logarithms are given at the foot of the tables.

(3) The distance  $m$  and position-angle  $M$  of the axis of the shadow relative to the observer, and the relative motions,  $n$  and  $N$ , are computed by the formulæ:—

$$\begin{aligned}m \sin M &= x - \xi \\ m \cos M &= y - \eta \\ n \sin N &= x' - \xi' \\ n \cos N &= y' - \eta'\end{aligned}$$

(4) The radius  $L$  of the shadow or penumbra at the distance  $\zeta$  from the fundamental plane is computed by the formula

$$L = l - \zeta \tan f$$

$l$  and  $f$  being found in the table of elements, and  $\zeta$  computed in (1).

(5) If the time chosen for computation is exactly that of the beginning or end of the eclipse, we shall have—

$$m = L$$

But, as this condition can scarcely ever be fulfilled on a first trial, a correction  $\tau$  to the assumed time is computed thus: Find the angle  $\psi$  from the equation,

$$\sin \psi = \frac{m \sin (M - N)}{L}$$

There will be two values to this angle, of which one will be in the first and the other in the second quadrant when  $\sin \psi$  is positive, and one in the third and the other in the fourth when  $\sin \psi$  is negative. But, simplicity will be gained by taking only that value of  $\psi$  for which  $\cos \psi$  is positive. This value lies between the limits  $+90^\circ$  and  $-90^\circ$ . The correction  $\tau$  to the assumed time will be found in minutes, from—

$$\text{For beginning:} \quad \tau = - \frac{m \cos (M - N)}{n} - \frac{L \cos \psi}{n}$$

$$\text{For ending:} \quad \tau = - \frac{m \cos (M - N)}{n} + \frac{L \cos \psi}{n}$$

One such pair of values of  $\tau$  cannot, however, give the times of both beginning and ending with accuracy. To attain accuracy we must, in commencing the computation, assume two times, one near that of beginning, and another near that of ending. These approximate times may be derived from the chart of the eclipse. The computation for the first assumed time will give a small value of  $\tau$  which, applied to the assumed time, will give a nearly correct time for the beginning of the eclipse, and a large value which, added to the assumed time, will give an inaccurate time of ending. The computation for the second assumed time will give a small and nearly correct value of  $\tau$ , to be applied to the assumed time for the end, and a large negative and inaccurate one to be subtracted for the beginning. We shall thus deduce two times of each phase, only one of which is to be considered approximately correct.

The more accurate times of beginning and ending may now be taken in place of the first assumed ones, and the computation may be repeated from the beginning, leading to a pair of values of  $\tau$ , which should be very small and accurate. Such a repetition of the computation will in general be advisable, to guard against accidental numerical errors. The following theorem will, however, enable us to obtain a second approximation to the true times of each phase without repeating the computation.

**THEOREM.**—*The error of each result is approximately proportional to the square of the correction  $\tau$ , multiplied by the sine of the sun's hour-angle,  $(\mu-\lambda)$ , for the middle of the interval between the time of computation and that of the phase.*

To apply this theorem we find the two values of  $\tau^2 \sin(\mu-\lambda)$  corresponding to the required phase. We then find the ratio of these quantities—which will commonly be a large number, and divide the difference of the results by this ratio. The quotient will be a correction to be applied to the more accurate result in such a way as to make it deviate yet more from the less accurate one. This correction should be positive in the local forenoon, and negative in the afternoon, and its value should never materially exceed  $0^m.001 \tau^2$ .

Unless the times chosen for computation are unusually in error, say ten minutes or more, the corrected results thus obtained will be theoretically correct within less than a second. But to guard against numerical errors it is better, after making this final correction, to repeat the computations so far as to obtain new values of  $m$  and  $L$  for the corrected times. If these two quantities agree within a unit of the fourth place of decimals, the times employed are generally correct within a second of time. If they differ too widely, further corrections and computations may be made by the computer according to his own judgment.

It may be remarked that the uncertainty of the ephemerides is such that a prediction may be several seconds in error from this unavoidable cause alone.

**Position-angle of Point of Contact.**—The position-angle  $P$ , of the point of contact, reckoned from the north point of the sun's limb toward the east, is found by the formula

$$\text{For beginning:} \quad P = N - \phi \pm 180^\circ$$

$$\text{For end:} \quad P = N + \phi$$

it being assumed that, in each case, the value of  $\phi$  is taken between the limits  $\pm 90^\circ$ .

Computation of the Solar Eclipse of 1898, January 21, for a place near Ratnagherry, India, whose position is—

$$\text{Latitude, } \phi = + 16^\circ 48'$$

$$\text{Longitude, } \lambda = - 73^\circ 28'$$

Constants for the given place:—

$$\rho \sin \phi' = 9.45813$$

$$\rho \cos \phi' = 9.98119$$

From the Eclipse Charts and the table on page 416 we find the approximate times of the phases to be—

Beginning January	21 <sup>d</sup> 18 <sup>h</sup> 20 <sup>m</sup>	} Greenwich Mean Time.
Total phase	21 19 54	
Ending	21 21 20	

Greenwich Mean Time,	Beginning.			Total Phase.			Ending.		
	January	21 <sup>d</sup>	18 <sup>h</sup> 20 <sup>m</sup>	19 <sup>h</sup>	54 <sup>m</sup>		21 <sup>h</sup>	20 <sup>m</sup>	
			° ' "	° ' "	° ' "		° ' "	° ' "	
$\mu$			272 2 30		295 32 24		317 2 18		
$\lambda$			— 73 28 0		— 73 28 0		— 73 28 0		
$\mu-\lambda$			345 30 30		9 0 24		30 30 18		
$\rho \cos \phi'$			9.98119		9.98119		9.98119		
$\sin(\mu-\lambda)$			9.39836 <i>n</i>		9.19465		9.70553		
$\log \xi$			9.37955 <i>n</i>		9.17584		9.68672		
$\xi$	—		0.23963	+	0.14991	+	0.48609		

Greenwich Mean Time,	January	Beginning. 21 <sup>d</sup> 18 <sup>h</sup> 20 <sup>m</sup>	Total Phase. 19 <sup>h</sup> 54 <sup>m</sup>	Ending. 21 <sup>h</sup> 20 <sup>m</sup>
	$\rho \sin \varphi'$	9.45813	9.45813	9.45813
	$\cos d$	9.97393	9.97396	9.97400
		9.43206	9.43209	9.43213
(1)	$+$	0.27043	$+$ 0.27045	$+$ 0.27048
	$\rho \cos \varphi'$	9.98119	9.98119	9.98119
	$\sin d$	9.52685 $\pi$	9.52655 $\pi$	9.52627 $\pi$
	$\cos (\mu - \lambda)$	9.98596	9.99461	9.93530
		9.49400 $\pi$	9.50235 $\pi$	9.44276 $\pi$
(2)	$-$	0.31189	0.31794	$-$ 0.27718
(1) - (2)	$\eta$	$+$ 0.58232	$+$ 0.58839	$+$ 0.54766
	$\rho \sin \varphi' \sin d$	8.98498 $\pi$	8.98468 $\pi$	8.98440 $\pi$
(3)	$-$	0.09660	$-$ 0.09653	$-$ 0.09647
	$\rho \cos \varphi' \cos d \cos (\mu - \lambda)$	9.94108	9.94976	9.89049
(4)	$+$	0.87314	$+$ 0.89076	$+$ 0.77712
(3) + (4)	$\zeta$	$+$ 0.77654	$+$ 0.79423	$+$ 0.68065
	const. log	7.63992	7.63992	7.63992
	$\rho \cos \varphi' \cos (\mu - \lambda)$	9.96715	9.97580	9.91649
	$\log \xi'$	7.60707	7.61572	7.55641
	$\xi'$	$+$ 0.004046	$+$ 0.004128	$+$ 0.003601
	const. log	7.63992	7.63992	7.63992
	$\xi \sin d$	8.90640	8.70239 $\pi$	9.21299 $\pi$
	$\log \eta'$	6.54632	6.34231 $\pi$	6.85291 $\pi$
	$\eta'$	$+$ 0.000352	$-$ 0.000220	$-$ 0.000713
	$x - \xi$	$-$ 0.45713	$-$ 0.00092	$+$ 0.43638
	$y - \eta$	$-$ 0.28207	$-$ 0.00124	$+$ 0.30241
	$x' - \xi'$	$+$ 0.004953	$+$ 0.004867	$+$ 0.005390
	$y' - \eta'$	$+$ 0.002697	$+$ 0.003275	$+$ 0.003773
	$m \sin M$	9.66004 $\pi$	6.96379 $\pi$	9.63986
	$m \cos M$	9.45036 $\pi$	7.09342 $\pi$	9.48060
	$\tan M$	0.20968	9.87037	0.15926
	$M$	238 19 24	216 34 23	55 16 40
	$\sin M$	9.92994 $\pi$	9.77514 $\pi$	9.91483
	$\log m$	9.73010	7.18865	9.72503
	$\pi \sin N$	7.69487	7.68726	7.73159
	$\pi \cos N$	7.43088	7.51521	7.57669
	$\tan N$	0.26399	0.17205	0.15490
	$N$	61 25 52	56 3 48	55 0 28
	$\sin N$	9.94361	9.91890	9.91341
	$\log n$	7.75126	7.76836	7.81818
	$\tan f$	7.67674	7.67457	7.67673
	$\log \zeta$	9.89016	9.89995	9.83292
		7.56690	7.57452	7.50965
	$\zeta \tan f$	$+$ 0.00369	$+$ 0.00375	$+$ 0.00323
	$l$	$+$ 0.54346	$-$ 0.00229	$+$ 0.54369
	$L$	$+$ 0.53977	$-$ 0.00604	$+$ 0.54046

Greenwich Mean Time,	January	Beginning. 21 <sup>d</sup> 18 <sup>h</sup> 20 <sup>m</sup>	Total Phase. 19 <sup>h</sup> 54 <sup>m</sup>	Ending. 21 <sup>h</sup> 20 <sup>m</sup>
$M - N$		176° 53' 32"	160° 30' 35"	0° 16' 12"
$\sin (M - N)$		8.73411	9.52329	7.67324
$\log m$		9.73010	7.18865	9.72503
$\csc L$		0.26779	2.21896 $n$	0.26724
$\sin \phi$		8.73200	8.93090 $n$	7.66551
$\phi$		3° 5' 34"	— 4° 53' 34"	0° 15' 55"
$\log \frac{m}{n}$		1.97884	9.42029	1.90685
$\cos (M - N)$		9.99936 $n$	9.97437 $n$	0.00000
		1.97820 $n$	9.39466 $n$	1.90685
$-\frac{m}{n} \cos (M - N)$		+ 95.104	+ 0.248	—80.696
$\log L$		9.73221	7.78104 $n$	9.73276
$\cos \phi$		9.99937	9.99841	0.00000
$\csc n$		2.24874	2.23164	2.18182
		1.98032	0.01109 $n$	1.91458
$\frac{L \cos \phi}{n}$		— 95.570	$\mp$ 1.026	+82.145
$r$		$\frac{m}{n}$ — 0.466	$\frac{m}{n}$ — 0.778 + 1.274	$\frac{m}{n}$ + 1.449
$T$		$\frac{h}{m}$ 18 20	$\frac{h}{m}$ 19 54	$\frac{h}{m}$ 21 20
$t$		18 19.534	19 53.222 19 55.274	21 21.449
$\lambda$		— 4 53.867	— 4 53.867	— 4 53.867
$d$		$\frac{h}{m}$	$\frac{d}{h}$ 22 0 47.089 22 0 49.141	$\frac{d}{h}$ 22 2 15.316
Local Mean Time,	January	21 23 13.401		
Duration of totality,			$\frac{m}{n}$ 2.05	

No correction is necessary since the assumed times differ very little from the computed ones.

Therefore we have

Beginning of the eclipse,	January	21	23	13	24.1	} Local Mean Time.
Beginning of total eclipse,	"	22	0	47	5.3	
End of total eclipse,	"	22	0	49	8.5	
End of the eclipse,	"	22	2	15	19.0	

Angle of position:

	Beginning.	Ending.
$N$	61° 25.9	55° 0.5
$\phi$ (+ 180°)	176 54.4	0 15.9
$P$	238 20.3	55 16.4

from the north point of the sun's disk towards the east for direct image.

*The Mean Places of Stars Occulted During the Year.*—Pages 420—423 contain the mean places for 1898.0 of stars (other than those given on pages 293—301) occulted by the moon in 1898, with their annual proper motions.

*Elements of Occultations.*—Pages 424—455 give the elements for the prediction of the times of occultation of stars and planets by the moon. In the columns referring to the star, those headed *Red'ns from 1898.0* give the quantities necessary to reduce the mean place of the star at the beginning of 1898 to its apparent place at the time of occultation. These reductions are sufficiently accurate to be definitive.

The quantities in the following five columns are all given for the moment of geocentric conjunction of the star and moon in right ascension. Let there be a line passing from the star through the centre of the moon, and let a plane perpendicular to this line pass through the centre of the earth: this plane will be the fundamental plane for the occultation. The system of co-ordinates is similar to that already described for eclipses. The cone circumscribing the moon and star may be regarded as a cylinder having everywhere the same diameter as the moon. This cylinder will intercept the fundamental plane in a circle of which the linear diameter will be the same as that of the moon.

The *Washington Mean Time* is the moment at which the two bodies are in geocentric conjunction in right ascension. At this moment the co-ordinate  $x$  of the axis of the cylinder on the fundamental plane has the value zero. The column *Hour-Angle H* gives the common geocentric hour-angle of the moon and star at the same moment, counted from the meridian of Washington—positive toward the west and negative toward the east. Column  $Y$  gives the co-ordinate  $y$  of the axis of the cylinder upon the fundamental plane at the same moment. Columns  $x'$  and  $y'$  give the hourly variation of  $x$  and  $y$ . The linear unit in these columns is the earth's equatorial radius. The limiting parallels, north and south, show the extreme limits of latitude within which the occultation will be visible.

By the aid of these elements, the Washington mean time of immersion and emersion of a star behind the limb of the moon may be computed for any part of the earth by a method nearly the same as that already explained for computing eclipses, only more simple.

We shall first show how to compute an isolated occultation for a particular place, assuming it to be visible at that place, and then show how all the occultations which will be visible at a place may be selected and computed by a more rapid process.

(1) The geocentric co-ordinates of the place,  $\rho \sin \phi'$  and  $\rho \cos \phi'$ , are to be computed by the formulæ and table given in connection with eclipses on page 513.

As in the case of eclipses, it is necessary to have an approximate time of the phenomenon, corresponding to that obtained from the charts of the eclipses. The quantity  $H$  being the Washington west hour-angle of the two bodies at the moment of geocentric conjunction,  $H - \lambda$  will be the local hour-angle of the star at this same moment. Let us call this angle  $h_0$ , putting

$$h_0 = H - \lambda$$

where  $\lambda$  is the longitude west of *Washington*.

The next step will then be to find the approximate moment of apparent conjunction in right ascension as seen from the place. An approximate correction to reduce the time and hour-angle for geocentric conjunction to those for apparent conjunction may be taken from Mr. DOWNES's table, on pages 458—459. This correction will have the same sign as  $h_0$ .

When this table is not available, the correction may be computed thus: Compute the quantities  $\xi_0$ ,  $\xi'$  and  $\tau$  from the formulæ,

$$\begin{aligned}\xi_0 &= \rho \cos \phi' \sin h_0 \\ \xi' &= [9.4192] \cos (h_0 + \frac{1}{3} h_0) \\ \tau &= \frac{\xi_0}{x' - \xi'}\end{aligned}$$

$\tau$  will then be the approximate interval between the times of geocentric and local conjunction. By applying it to the Washington mean time of the former, as given with the elements, we shall have the Washington mean time of the latter within a few minutes.

The average duration of an occultation is about an hour. Thence, by adding  $0^h.5$  to and subtracting it from the mean time of apparent conjunction, we shall have approximate times of the phases of immersion and emersion for farther computation. Let us then put,

$$\tau_1 = \tau - 0^h.5$$

$$\tau_2 = \tau + 0^h.5$$

$T$ , the Washington mean time of geocentric conjunction in R. A.

$d$ , the declination of the star.

(2) Compute for the moments  $T + \tau_1$  and  $T + \tau_2$  the following quantities, in which we write  $\tau$  for each of the quantities  $\tau_1$  and  $\tau_2$ . The latter, when used as angles, are to be changed to arc by multiplying by 15, and the minutes are to be further increased by one-sixth the number of degrees in order to reduce to the sidereal hour-angle.

$$\xi = \rho \cos \varphi' \sin (h_0 + \tau)$$

$$\eta = \rho \sin \varphi' \cos d - \rho \cos \varphi' \sin d \cos (h_0 + \tau)$$

$$\xi' = [9.41916] \rho \cos \varphi' \cos (h_0 + \tau)$$

$$\eta' = [9.41916] \rho \cos \varphi' \sin d \sin (h_0 + \tau) = [9.41916] \xi \sin d$$

$$x = x' \tau$$

$$y = Y + y' \tau$$

Compute  $m$ ,  $M$ ,  $n$  and  $N$  from the equations

$$m \sin M = x - \xi$$

$$m \cos M = y - \eta$$

$$n \sin N = x' - \xi'$$

$$n \cos N = y' - \eta'$$

$$n' = \frac{n}{60} = [8.22185] n$$

$$\sin \psi = [0.56500] m \sin (M - N)$$

Then,  $t_1$  and  $t_2$  from the equations

$$t_1 = -\frac{m}{n'} \cos (M - N) - \frac{[9.43500]}{n'} \cos \psi \quad (\text{Beginning.})$$

$$t_2 = -\frac{m}{n'} \cos (M - N) + \frac{[9.43500]}{n'} \cos \psi \quad (\text{End.})$$

The quantities  $t_1$  and  $t_2$  will then be the corrections in minutes to be applied to the respective times  $T + \tau_1$  and  $T + \tau_2$  to obtain the Washington mean times of the phases.

As in the case of eclipses, the small value of  $t_1$  will give an accurate result for one phase, and the large value an inaccurate result for the other. Both accurate results may then be corrected by comparison with the inaccurate one, in the way described for eclipses, and a result obtained which will probably be correct within a fraction of a minute of time.

As a check upon the result, it will be advisable to compute  $\xi$ ,  $\eta$ ,  $x$  and  $y$  for the moments finally obtained. If the times are correct these quantities will fulfil the condition,

$$\sqrt{(x - \xi)^2 + (y - \eta)^2} = 0.27227$$

If  $\log m \sin (M - N) = 9.43500$  nearly, a recalculation will generally be necessary to determine whether, numerically,  $\sin \psi < 1$ , or  $\sin \psi > 1$ . In the latter case, the impossible value of  $\sin \psi$  indicates that an occultation at the given place is impossible, unless the computed distance from the moon's limb is within the errors of the ephemerides of the moon and star.

In such cases of near approach to the moon's limb, we may take  $\psi = 90^\circ$ , or  $270^\circ$ , according as  $\sin (M - N)$  is positive or negative; and for finding the time of nearest approach,

$$t = -\frac{m \cos (M - N)}{n'}$$

Putting  $\pi$  for the moon's horizontal parallax, the distance from the moon's limb will be,

$$\pi [m \sin (M - N) - 0.27227]$$

disregarding the sign of  $\sin (M - N)$ ; or, allowing for the augmentation of the semidiameter,

$$\pi [m \sin (M - N) - 0.27227] [1 + s \sin \pi]$$

where

$$s = \rho \cos \varphi' \cos d \cos (h_0 + \tau) + \rho \sin \varphi' \sin d$$

The position-angle  $P$ , of the line from the moon's centre to the star at the times of contact, reckoned from the north point toward the east, is given by the formulæ:—

$$P = N - \phi \quad \text{for immersion,}$$

$$P = N + \phi \pm 180^\circ \quad \text{for emersion,}$$

it being supposed that the value of  $\phi$ , in each case, is taken between the limits  $\pm 90^\circ$ .

To find the angle from the vertex, we compute the angle  $C$  from the formula,

$$\tan C = \frac{\xi + \iota \xi'}{\eta + \iota \eta'}$$

in which the value of  $\iota$  corresponding to the phase is to be used. Then

$$V = P - C$$

is the angle from the vertex, also reckoned from the north toward the east.

As an example of an isolated occultation, we will compute that of  $\alpha$  Scorpii, on April 9, 1898, for Denver, whose position is

$$\begin{aligned} \varphi &= +39^\circ 40' 36''.4 \\ \lambda &= +1^h 51^m 35^s.6 \end{aligned}$$

Constants for the given place,

$$\begin{aligned} \rho \sin \varphi' &= 9.80278 \\ \rho \cos \varphi' &= 9.88690 \end{aligned}$$

From the elements on page 431, we have

$$\begin{aligned} H &= +1^h 42^m 0^s \\ h_0 &= H - \lambda = -0^h 9.593 \end{aligned}$$

From DOWNES's Table, pages 458 and 459, or from the formulæ on page 518, we find the correction to the Washington mean time of geocentric conjunction to be about  $-5^m$ , therefore the Washington mean time of apparent conjunction at the given place is April 9<sup>d</sup> 16<sup>h</sup> 45<sup>m</sup>.6; subtracting and adding 30<sup>m</sup>, we shall have the approximate Washington mean times of immersion and emersion to be used in the computation, thus:

$$\begin{aligned} \tau_1 &= -0^h 35^m \\ \tau_2 &= +0^h 25^m \end{aligned} \quad \begin{aligned} T + \tau_1 &= \text{April } 9^d 16^h 15.6^m \\ T + \tau_2 &= \quad \quad 9^d 17^h 15.6^m \end{aligned}$$

Washington Mean Time,	April	Immersion.			Emersion.		
		d	h	m	d	h	m
	$h_0$	9	16	15.6	9	17	15.6
	$\tau$ (in sidereal time)	—	—	9.593	—	—	9.593
	$h_0 + \tau$ (in arc)	—	—	35.096	+	—	25.068
		—	11°	10' 20"	+	3°	52' 7".5
	$\rho \cos \varphi'$			9.88690			9.88690
	$\sin (h_0 + \tau)$			9.28726			8.82912
	$\log \xi$			9.17416			8.71602
	$\xi$	—	—	0.14933	+	—	0.05200



Washington Mean Time,	April	Immersion. 9 <sup>d</sup> 16 <sup>h</sup> 15 <sup>m</sup> .6	Emersion. 17 <sup>h</sup> 15 <sup>m</sup> .6
	$\rho \sin \varphi'$	9.80278	9.80278
	$\cos d$	9.95289	9.95289
	(1)	9.75567	9.75567
	$\rho \cos \varphi'$	+ 0.56973	+ 0.56973
	$\sin d$	9.88690	9.88690
	$\cos (h_0 + \tau)$	9.64507 <i>n</i>	9.64507 <i>n</i>
		9.99169	9.99901
	(2)	9.52366 <i>n</i>	9.53098 <i>n</i>
(1) - (2)	$\eta$	- 0.33393	0.33961
	const. log	+ 0.90366	+ 0.90934
	$\rho \cos \varphi' \cos (h_0 + \tau)$	9.41916	9.41916
		9.87859	9.88591
	$\log \xi'$	9.29775	9.30507
	$\xi'$	+ 0.19850	+ 0.20187
	const. log	9.41916	9.41916
	$\xi \sin d$	8.81923	8.36109 <i>n</i>
	$\log \eta'$	8.23839	7.78025 <i>n</i>
	$\eta'$	+ 0.01731	0.00603
	$\log x$	9.78017	9.78017
	$\log \tau$	9.76592 <i>n</i>	9.61979
	$\log z$	9.54609 <i>n</i>	9.39996
	$x$	- 0.35163	+ 0.25116
	$\log y'$	8.78746 <i>n</i>	8.78746 <i>n</i>
	$\log y' \tau$	8.55338	8.40725 <i>n</i>
	$y' \tau$	+ 0.03576	- 0.02554
	$Y$	+ 1.07210	+ 1.07210
	$y$	+ 1.10786	+ 1.04656
	$x - \xi$	- 0.20230	+ 0.19916
	$y - \eta$	+ 0.20420	+ 0.13722
	$x' - \xi'$	+ 0.40430	+ 0.40093
	$y' - \eta'$	- 0.07861	- 0.05527
	$m \sin M$	9.30600 <i>n</i>	9.29920
	$m \cos M$	9.31006	9.13741
	$\tan M$	9.99594 <i>n</i>	0.16179
	$M$	315° 16' 5"	55° 26' 2"
	$\sin M$	9.84744	9.91565
	$\log m$	9.45856	9.38355
	$n \sin N$	9.60670	9.60307
	$n \cos N$	8.89548 <i>n</i>	8.74249 <i>n</i>
	$\tan N$	0.71122 <i>n</i>	0.86058 <i>n</i>
	$N$	101° 0' 12"	97° 50' 56"
	$\sin N$	9.99194	9.99591
	$\log n$	9.61476	9.60716
	colog 60	8.22185	8.22185
	$\log n'$	7.83661	7.82901

Washington Mean Time,	April	Immersion.	Emersion.
		9 <sup>d</sup> 16 <sup>h</sup> 15 <sup>m</sup> .6	17 <sup>h</sup> 15 <sup>m</sup> .6
	const. log	0.56500	0.56500
	log $m$	9.45856	9.38355
	sin ( $M - N$ )	9.75052 $n$	9.82898 $n$
	sin $\phi$	9.77408 $n$	9.77753 $n$
	$\psi$	-36° 28' 10"	-36° 48' 32"
	log $\frac{m}{n'}$	1.62195	1.55454
	cos ( $M - N$ )	9.91721 $n$	9.86822
		1.53916 $n$	1.42276
	$-\frac{m}{n'} \cos (M - N)$	+ 34.607	- 26.470
	const. log	9.43500	9.43500
	colog $n'$	2.16339	2.17099
	cos $\phi$	9.90535	9.90344
		1.50374	1.50943
	$\frac{[9.43500] \cos \phi}{n'}$	- 31.896	+ 32.317
	$\tau$	+ 2.711	+ 5.847
	$T$	April 9 <sup>d</sup> 16 <sup>h</sup> 15.600	17 <sup>h</sup> 15.600
Washington Mean Time of Phase,		April 9 16 18.311	17 21.447
	$\lambda$	1 51.593	1 51.593
Denver Mean Time,		April 9 14 26.718	15 29.854
Angle of position:			
	$N$	101 0.2	97 50.9
	$\phi (+ 180^\circ)$	- 36 28.2	36 48.5
	$P$	137 28.4	241 2.4

from the north point of the moon's limb toward the east for direct image.

*Prediction of Many Occultations for a Given Place.*—When it is desired to predict all the occultations which will be visible at some one place, tables may be constructed and applied in such a way as to greatly diminish the labor of computation. In using such tables, the most convenient course will be to find for each occultation the hour-angle of the star at the moment of apparent conjunction in right ascension, as seen from the place of observation. The table of elements, pages 424—455, gives  $H$ , the Washington hour-angle at the moment of geocentric conjunction. The corresponding geocentric hour-angle at the place will be

$$h_0 = H - \lambda \quad (\lambda = \text{west longitude from Washington}).$$

The moment of apparent conjunction, as seen from the station, will be given by the condition  $\xi = x$ ; or, using the values of  $\xi$  and  $x$ ,

$$\rho \cos \varphi' \sin h = x' \tau$$

$h$  being the west hour-angle of the star at the moment in question, and  $\tau$  the interval, in hours of mean time, which has elapsed since geocentric conjunction. We shall therefore have,

$$h = h_0 + \tau$$

for the hour-angle at the end of the interval  $\tau$  after geocentric conjunction. In strictness,  $\tau$  should here be multiplied by the factor  $1 + \frac{1}{365.25}$ , because the star moves a little more than  $15^\circ$  in an hour of mean time; but the error arising from the neglect of the factor is too small to be important, as it will affect the predicted time of conjunction by less than 10 seconds. The equation for finding  $\tau$  is therefore,

$$\rho \cos \varphi' \sin (h_0 + \tau) = x' \tau$$

The quantities  $h_0$  and  $x'$  being derived immediately from the data of the Ephemeris, the quantity  $\tau$  is readily obtained by successive approximation, and may be tabulated as a function of  $h_0$  and  $x'$ . The computation of  $\tau$  is effected as follows. We have

$$\sin (h_0 + \tau) = \sin h_0 + 2 \sin \frac{1}{2} \tau \cos (h_0 + \frac{1}{2} \tau) \quad (1)$$

The value of  $\tau$  in arc being seldom more than  $24^\circ$  we may put  $\tau$  itself for  $2 \sin \frac{1}{2} \tau$ . The equation will then become

$$\rho \cos \varphi' \sin h_0 + \tau \rho \cos \varphi' \cos (h_0 + \frac{1}{2} \tau) = x' \tau$$

from which we find

$$\tau = \frac{\rho \cos \varphi' \sin h_0}{x' - \rho \cos \varphi' \cos (h_0 + \frac{1}{2} \tau)} \quad (2)$$

To tabulate  $\tau$ , we must first have a table of the quantities

$$\begin{aligned} \xi &= \rho \cos \varphi' \sin h \\ \xi' &= [9.41916] \rho \cos \varphi' \cos h \end{aligned} \quad (3)$$

which table may be formed for every 10 minutes (in time) of  $h$ . If we then put  $\xi_0$  for the value of  $\xi$  corresponding to  $h = h_0$  and  $\xi'_1$  for the value of  $\xi'$  corresponding to  $h = h_0 + \frac{1}{2} \tau$ , we shall have

$$\tau = \frac{\xi_0}{x' - \xi'_1} \quad (4)$$

Since we must know the value of  $\tau$ , approximately, before we can take  $\xi'_1$  from the table, this equation can be solved only by successive approximations. The approximations converge so rapidly as to offer no difficulty. It will be best to begin by comparing values of  $\tau$  for the two extremes of  $x'$ , namely,  $x' = 0.48$  and  $x' = 0.60$ , because the approximate values of  $\tau$  can then be interpolated for all the intermediate values of  $x'$ . For the first approximation may be taken—

$$\begin{aligned} \frac{1}{2} \tau &= 50^m \sin \frac{4}{3} h_0 \quad (\text{for } x' = 0.48) \\ \frac{1}{2} \tau &= 40^m \sin \frac{4}{3} h_0 \quad (\text{for } x' = 0.60) \end{aligned} \quad (5)$$

or, the approximate values of  $\tau$  may be taken from Mr. DOWNES's table, pages 458—459. It will be best to make the computation for every  $30^m$  of  $h_0$ , and to find the intermediate values of  $\tau$  for every  $10^m$  by interpolation. Then for each  $30^m$  of  $h_0$  we take  $\xi'$  from a table with the argument  $h_0 + \frac{1}{2} \tau$ , and  $\log \xi$  with the argument  $h_0$ , and thence compute  $\tau$  by (4). If the value of  $\tau$  thus arrived at differs more than  $3^m$  from that employed in taking out  $\xi'$ , a new value may be used to correct  $\xi'$ , and the computation may be repeated. The values corresponding to  $x' = 0.51$ ,  $x' = 0.54$ , and  $x' = 0.57$ , can then be computed with the single interpolation of approximate values of  $\tau$ , and afterward the table can be extended by interpolation to every  $0.01$  of  $x'$  between  $x' = 0.48$  and  $x' = 0.60$ . It will be best to compute  $\tau$  in the first place to every  $0.001$  of an hour, and to drop the last figure in forming the definitive table. The table thus formed will be called *Table I*.

The values of  $\eta$  and  $\eta'$  may then be tabulated for every degree of the star's declination, and every 10<sup>m</sup> of  $h$ . It is a mere question of convenience whether to compute the table for negative values of  $d$ , since by putting

$$\begin{aligned}\eta_1 &= \rho \sin \varphi' \cos d \\ \eta_2 &= -\rho \cos \varphi' \sin d \cos h\end{aligned}$$

$\eta_1$  may be given in a table of single-entry; and taking  $\eta_2$  from the table of double-entry for a positive  $d$ , we shall have

$$\eta = \eta_1 \pm \eta_2$$

the lower sign being used for a negative  $d$ . But the extension of the table for  $\eta$  to negative values of  $d$  is so readily made that it will probably be found better to do it, so as to save taking out  $\eta_1$  and  $\eta_2$  separately.

This table for  $\eta$  will be called *Table II*, and the corresponding one for  $\eta'$  with the same arguments *Table III*. The precepts for using the tables will then be as follow:—

From Table I with the arguments  $x'$  and  $H - \lambda = h_0$  take out the value of  $\tau$ . It will be sufficient to use the nearest 0.01 of  $x'$ .  $\tau$  will be of the same sign as  $h_0$ . Then, enter Table II with the arguments  $d$  (the star's declination) and  $h = h_0 + \tau$ , and take out the value of  $\eta$ . Form the quantities  $y = Y + y' \tau$ , and  $y - \eta$ . If the latter quantity lies between the limits  $\pm 0.28$ , it is almost certain that there will be an occultation. If it falls without the limits  $\pm 0.33$ , it is almost certain that there will not be an occultation. A convenient rule to adopt will be—

$$\begin{aligned}&< 0.10, \text{ limits } = \pm 0.29 \\ 0.10 < y' < 0.15, \text{ limits } &= \pm 0.30 \\ 0.15 < y' < 0.20, \text{ limits } &= \pm 0.31 \\ 0.20 < y' &\text{ limits } = \pm 0.33\end{aligned}$$

Here, only the absolute value of  $y'$  is to be considered, without respect to its algebraic sign.

If  $y - \eta$  falls between the limits thus indicated, take the values of  $\xi'$  and  $\eta'$  from the appropriate tables and compute  $v$ ,  $Q$  and  $\Delta$  from the equations

$$\begin{aligned}v \sin Q &= y' - \eta' \\ v \cos Q &= x' - \xi' \\ \Delta &= (y - \eta) \cos Q\end{aligned}$$

If  $\Delta > 0.2723$  or  $\log \Delta > 9.4350$  there will be no occultation, though the moon may graze the star when  $\Delta = 0.2723$  is very small. If  $\Delta < 0.2723$ , compute

$$\begin{aligned}\tau_1 &= -\frac{y - \eta}{v} \sin Q & \cos P &= \frac{\Delta}{0.2723} \quad (P < 180^\circ) \\ \tau_2 &= \frac{0.2723 \sin P}{v}\end{aligned}$$

We shall then have—

$$\text{Local mean time of immersion, } T - \lambda + \tau + \tau_1 - \tau_2$$

$$\text{Local mean time of emersion, } T - \lambda + \tau + \tau_1 + \tau_2$$

$$\text{Position-angle from north toward east at immersion, } 180^\circ - Q - P$$

$$\text{Position-angle from north toward east at emersion, } 180^\circ - Q + P$$

In predicting the occultations for a given place, the first operation will be to go over the list of occultations in the Ephemeris, and select those which may be visible. The conditions of possible visibility are:—

1. The limiting parallels in the last columns must include the latitude of the place.

2. The quantity  $H - \lambda$ , taken without regard to sign, must be less than the semi-diurnal arc of the star by at least one hour. On very rare occasions an emersion might be seen in the east horizon, or an immersion in the west, when this difference is a few minutes less than an hour.

3. The sun must not be much more than an hour above the horizon at the local mean time  $T - \lambda$ , unless the star is bright enough to be seen in the day time.

The most convenient course will be to write the value of  $-\lambda$  on the bottom of a sheet of paper, and passing through the list of occultations, pause over each one for which condition (1) is fulfilled, and examine whether conditions (2) and (3) are fulfilled. If either fails, the computer passes on. Very often it will require some examination to find whether  $H - \lambda$  or  $T - \lambda$  falls within the limits; in these cases, the computer may mark the occultation for trial and leave the decision for the subsequent operations. The whole list can be gone over in less than a day, and it will probably be found that about one-tenth of the occultations are marked for trial.

*Phenomena of Planets and Satellites*, pages 460—493.—These are, for the most part, sufficiently explained in the body of the work. The following additional explanations are added for completeness:—

*Disks of Mercury and Venus*, pages 460—461.—The angle  $\theta$ , needed in reducing meridian observations, is the angle which the arc of the great circle from the planet to the sun, makes with the arc from the planet toward the west, reckoned in the direction west, north, east, south. This position-angle is reckoned from  $0^\circ$  to  $360^\circ$ , as in the measurement of double stars, the planet taking the place of the central star. But its measure is  $90^\circ$  greater than that of a double star.

We may also regard  $\theta$  as expressing the angle which the line of cusps makes with the meridian, the positive direction of the meridian being toward the north, and the positive direction of the line of cusps that in which a person following this line would have the illuminated portion of the disk on his right.

*Satellites and Disk of Mars*, page 462.—This page gives the Washington mean time of the greatest eastern and western elongations, the position angles and the distance of the satellites from the centre of the planet, for elongations visible at Washington and the apparent disk of the planet for every thirtieth day throughout the year.

*Satellites of Jupiter*, pages 463—487.—The times of phenomena are explained at the foot of each page; the diagram is on page 463.

*Phenomena*, pages 494—495.—The conjunctions, quadratures, and oppositions of the planets with respect to the sun, give the hours when the longitude of each planet differs from that of the sun by  $0^\circ$ ,  $90^\circ$ , or  $180^\circ$ .

The conjunctions of the moon and planets with each other are given in right ascension. The degrees and minutes to the right show the difference of declination at the moment of conjunction.

*Latitude by Observed Altitude of Polaris*.—Table IV replaces the Tables A, B, C, D, given as a *Supplement* to the volumes of the Ephemeris for 1874—1881, and is intended for use at sea and reconnaissance on land. It will furnish an approximate value of the latitude, the probable error of which, in so far as the table is concerned, will be a few tenths of a minute of arc.

The directions for using the table are adapted to a right ascension of Polaris equal to  $1^h 21^m.8$ . Somewhat greater accuracy may be insured by substituting the right ascension of Polaris at the date of observation, from pages 302—313 of this volume.



## APPENDIX.

### ON THE CONSTRUCTION OF THE AMERICAN EPHEMERIS AND NAUTICAL ALMANAC FOR 1898.

IN the formulæ and numbers relating to the fixed stars, pages 280—292, the adopted constants of precession and aberration are those of STRUVE, and the nutation is that of PETERS, namely:

$$\text{Precession} = 50''.2411 + 0''.0002268 t$$

$$\text{Nutation} = 9''.2231 + 0''.000009 t$$

$$\text{Aberration} = 20''.4451$$

in which  $t$  is the number of years after 1800. These quantities have been used in all computations relating to the fixed stars.

The obliquity and nutation given on page 278 are derived from HANSEN's *Tables du Soleil*. These numbers have been used in all the ephemerides of the sun, moon and planets.

HANSEN's obliquity of the ecliptic is  $0''.27$  greater than that of PETERS given in the issues of this Ephemeris before 1882.

A comparison of HANSEN's mean obliquity with that of PETERS and of LE VERRIER at different epochs is given in the following table:—

Epoch.	HANSEN.			PETERS.	LE VERRIER.	H.—P.	H.—L.
	°	'	"	"	"	"	"
1750	23	28	18.19	17.44	19.42	+ 0.75	— 1.23
1800	23	27	54.80	54.22	55.63	+ 0.58	— 0.83
1850	23	27	31.42	30.99	31.83	+ 0.43	— 0.41
1900	23	27	8.02	7.76	8.03	+ 0.26	— 0.01

The formulæ for reducing the places of the fixed stars, page 280, correspond to the *Star Tables of the American Ephemeris*, Washington, 1869.

The mean right ascensions of stars have been reduced to NEWCOMB's fundamental standard in the catalogue attached to the *Washington Observations for 1870*, Appendix II, with the following exceptions: The right ascensions of the 48 circumpolar stars north of  $60^\circ$  north declination are from Dr. GOULD's *Standard Places of Fundamental Stars*, second edition, United States Coast Survey Office, 1866. Of the twelve stars south of  $50^\circ$  south declination, the positions of  $\beta$  Hydri,  $\alpha$  Trianguli Australis, and  $\sigma$  Octantis, have been corrected from data furnished by Dr. GOULD; while the remaining nine are, as before, from the *British Nautical Almanac* for 1848.

The right ascensions of the additional stars in the general list, whose apparent right ascensions are given in a subsequent section, have been taken partly from the *Catalogue of 1098 Standard Clock and Zodiacal Stars*, forming Part IV of Vol. I of *Astronomical Papers Prepared for the Use of the American Ephemeris and Nautical Almanac*, Washington, 1881; and partly from the catalogue of the Astronomische Gesellschaft of 1878. A few have been derived from recent catalogues without a rigorous reduction for equinox.

The mean declinations of stars are taken from Boss's paper in the *Report of the Northern Boundary Commission*, Washington, 1879, for all stars found therein. The declinations of all the other stars have been reduced to the same standard, except those of the additional ones above, which have been taken partly from the Astronomische Gesellschaft list, and partly from places in recent catalogues. To the apparent places of Sirius and Procyon have been applied the periodic corrections resulting from AUWERS's investigations.

The values of these corrections are :—

Year.	Sirius.		Procyon.	
1898.0	$\Delta \alpha = + 0.044$	$\Delta \delta = + 1.44$	$\Delta \alpha = + 0.065$	$\Delta \delta = - 0.40$
1899.0	$\Delta \alpha = + 0.022$	$\Delta \delta = + 1.40$	$\Delta \alpha = + 0.060$	$\Delta \delta = - 0.55$

The ephemeris of the sun is constructed from HANSEN and OLUFSEN's *Tables du Soleil*, Copenhagen, 1853, except that STRUVE's aberration has been used. This is equivalent to adding  $0''.19$  to the true longitudes, but it does not affect the right ascensions and declinations. The sun's rectangular equatorial co-ordinates have been computed from the longitudes and latitudes by the following formulæ :—

$$\begin{aligned} X &= R \cos \lambda \\ Y &= R \sin \lambda \cos \omega - 19.3 R \beta \\ Z &= R \sin \lambda \sin \omega + 44.5 R \beta \end{aligned}$$

The reductions to mean equinox, 1898.0, are computed by the formulæ,

$$\begin{aligned} \Delta X' &= + Y \sec \omega \Delta \lambda \sin 1'' \\ \Delta Y' &= - X \cos \omega \Delta \lambda \sin 1'' + Z \Delta \omega \sin 1'' - 9.4 \tau R \sin (\lambda + 186^\circ) \\ \Delta Z' &= - X \sin \omega \Delta \lambda \sin 1'' - Y \Delta \omega \sin 1'' + 21.7 \tau R \sin (\lambda + 186^\circ) \end{aligned}$$

Where—

$\lambda$  and  $\beta$  are the longitude and latitude of the sun referred to the equinox and ecliptic of the date;

$\omega$ , the obliquity of the ecliptic;

$\Delta \lambda$ , the reduction of longitude for precession and nutation from January 0;

$\Delta \omega$ , the reduction of the mean to the apparent obliquity;

$\tau$ , the fraction of the year since January 0.

The numerical coefficients are in units of the seventh place of decimals. The correction for latitude has been taken from GOETZE's paper in the *Astronomical Journal*, Vol. II, page 71.

The mean equatorial horizontal parallax of the sun, adopted from Professor NEWCOMB's *Investigation of the Distance of the Sun and the Elements which depend on it*,\* is  $8''.848$ . The adopted semidiameter of the sun at the earth's mean distance is  $16' 2''$ . In the computations pertaining to eclipses, BESSEL's semidiameter,  $15' 59''.788$  has been used.

The right ascension, declination and parallax of the moon are derived from HANSEN's *Tables de la Lune*, London, 1857, the mean longitude being corrected in accordance with NEWCOMB's *Researches on the Motion of the Moon*, Part I, page 268,† and a corrected table being substituted for Table XXXIV.

The semidiameter of the moon is computed from the moon's horizontal parallax by the formula,

$$S = 0.272274 \pi + 2''.5$$

The constant  $2''.5$  is omitted in the computation of eclipses and occultations, as due entirely to telescopic and ocular irradiation.

The ephemeris of Mercury is derived from Professor WINLOCK's *Tables of Mercury*, Washington, 1864. They are based on the older theory of LE VERRIER, published in the *Additions to the Connaissance des Temps* for 1848.

The ephemeris of Venus is derived from Mr. G. W. HILL's *Tables of Venus*, Washington, 1872.

The ephemeris of Mars is derived from manuscript tables constructed from LINDENAU's Tables. Mr. HUGH BREEN's results, contained in his paper *On the Corrections of LINDENAU's Elements of Mars*, published in the *Memoirs of the Royal Astronomical Society*, Vol. XX, have also been discussed and applied; and LE VERRIER's secular variations of the elements are

\* *Astronomical Observations made at the U. S. Naval Observatory, Washington, 1865, Appendix II.*

† *Astronomical Observations made at the U. S. Naval Observatory, Washington, 1875, Appendix II.*



likewise adopted. The perturbations produced by Jupiter have been numerically increased by  $\frac{1}{6}$  of their value. The following are the corresponding corrected elements and annual variations for Washington, 1855.0:—

$$\begin{aligned} L &= 320^{\circ} 13' 33.87'' + 689101.1527^{\circ} t \\ \pi &= 333^{\circ} 23' 17.84'' + 65.9990^{\circ} t \\ \Omega &= 48^{\circ} 25' 55.29'' + 27.6997^{\circ} t \\ i &= 1^{\circ} 51' 2.20'' - 0.02141^{\circ} t \\ e &= .19238''.75 + 0.18549 t \\ n &= 689050''.8927 \\ a &= 1.5236915 \end{aligned}$$

The ephemeris of Jupiter is derived from manuscript tables constructed from BOUVARD'S Tables, with such changes as were required to make them correspond more nearly to the formulæ.

The ephemeris of Saturn is derived from a provisional theory constructed by Mr. GEORGE W. HILL, and still unpublished.

The ephemerides of Uranus and Neptune are derived from Professor NEWCOMB'S Tables, published by the *Smithsonian Institution*.

The semidiameters of the planets are computed from the following values:—

	Semidiameter.	Log Dist.	Authority.
Mercury	3.34	0.00	LE VERRIER, <i>Theory of Mercury</i> .
Venus	8.546 $\pm$ 0.086	0.00	
Mars	2.842 $\pm$ 0.057	0.25	PEIRCE, from the Washington Observations of 1845 and 1846, made with the Mural Circle.
Jupiter (polar)	18.78 $\pm$ 0.067	0.70	
Saturn (polar)	8.77 $\pm$ 0.039	0.95	
Uranus	1.68 $\pm$ 0.3	1.30	
Neptune	1.28	1.48	
Jupiter (equatorial)	20.00	0.70	
Saturn (equatorial)	9.38	0.95	

The elements of eclipses of the sun and occultations of stars by the moon are given in accordance with BESSEL'S method, using the special forms in CHAUVENET'S *Spherical and Practical Astronomy*. The constants adopted for the eclipses are:—

Sun's mean equatorial horizontal parallax . . . . .	8.800
Semidiameter of the sun at distance unity, BESSEL . . .	959.788
Ratio of radius of moon to radius of earth, BURCKHARDT . .	0.27227

The eclipses of Jupiter's satellites are computed from TODD'S *Continuation of DAMOISEAU'S Tables*, Washington, 1876. The occultations, transits, etc., are computed from WOOLHOUSE'S Tables, *British Nautical Almanac* for 1835, Table II of each satellite having been adapted to DAMOISEAU'S Tables.

The elongations and conjunctions of the satellites of Saturn are computed from manuscript tables prepared by Professor NEWCOMB.

The apparent elements of the rings of Saturn are computed from BESSEL'S data, except those for the dusky ring.

The elongations of the satellites of Uranus, and of the satellite of Neptune are computed from the data of Professor NEWCOMB'S *Uranian and Neptunian Systems*, Washington, 1875.

In compiling the positions of observatories, the latest available data have been used. The positions have been furnished, in many instances, through the courtesy of the directors of the Observatories, in response to a circular issued by the Superintendent of the American Ephemeris.

The reduction to geocentric latitude, and the logarithm of the radius of the earth, are derived from CLARKE'S elements of the terrestrial spheroid, as adopted by the U. S. Coast and Geodetic Survey.

$$\log e = 8.9152503$$

$$\varphi' - \varphi = -11' 40''.43 \sin 2 \varphi + 1''.19 \sin 4 \varphi$$

$$\log \rho = 9.9992645 + 0.0007374 \cos 2 \varphi - 0.0000019 \cos 4 \varphi$$

Table IV, for finding the latitude from an observed altitude of Polaris, is constructed for—

- (1) An altitude of Polaris equal to  $45^\circ$ .
- (2) A declination of Polaris equal to  $+ 88^\circ 46'.1$ .

The principal computations of the Ephemeris have been distributed in the following manner:—

The ephemeris of the Sun was computed by Mrs. E. B. DAVIS; the Moon's longitude, latitude, semidiameter and horizontal parallax, by Professor KEITH; the right ascension and declination in the office of the British Nautical Almanac, by an arrangement for exchange of work with that office; the culminations, by Professor W. W. HENDRICKSON; the lunar distances, by Mr. BRADFORD; Mercury and Venus, by Mr. E. P. AUSTIN; Mars, Jupiter, Saturn, Uranus, and Neptune, by Mr. ROBERDEAU BUCHANAN; Jupiter's satellites, by Professor H. D. TODD; the satellites of Saturn, Uranus, and Neptune, by Mr. C. KEITH. The mean and apparent places of the fixed stars were prepared by Mr. HEDRICK, Miss E. A. HEDRICK, and Mr. H. L. RICE; the general constants for their reduction, by Mr. BUCHANAN; the occultations, by Mr. AUHAGEN; and the eclipses were computed and the charts projected by Mr. BUCHANAN

**CORRECTION REQUIRED, ON ACCOUNT OF SECOND DIFFERENCES OF THE MOON'S  
MOTION, IN FINDING THE GREENWICH TIME CORRESPONDING  
TO A CORRECTED LUNAR DISTANCE.**

Approximate Interval.		DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.																									
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52
h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	10	0	0	0	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3
0	20	0	1	1	1	1	1	2	2	2	2	3	3	3	3	4	4	4	4	5	5	5	5	6	6	6	6
0	30	0	1	1	2	2	2	3	3	3	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9
0	40	0	1	1	2	2	3	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	10	11	11	11
0	50	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	9	9	10	10	10	11	12	12	13	13	13
1	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10	10	11	12	12	13	14	14	14
1	10	1	1	2	2	3	4	4	5	6	6	7	8	8	9	9	10	11	11	12	12	13	13	14	15	15	15
1	20	1	1	2	3	3	4	4	5	6	7	7	8	9	9	10	10	11	12	12	13	14	14	15	15	16	16
1	30	1	1	2	3	3	4	4	5	6	7	8	8	9	9	10	11	11	12	12	13	14	14	15	16	16	16
		DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.																									
		54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	98	100	
h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
0	10	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	7	
0	20	7	7	7	7	8	8	8	8	9	9	9	9	9	10	10	10	10	11	11	11	11	12	12	12	12	
0	30	9	10	10	10	11	11	12	12	12	13	13	13	14	14	14	14	15	15	16	16	16	17	17	17	17	
0	40	12	12	13	13	13	14	14	15	15	16	16	16	17	17	18	18	18	19	19	20	20	21	21	21	22	
0	50	14	14	15	15	16	16	16	17	17	18	19	19	20	20	21	21	22	22	22	23	23	24	24	24	25	
1	0	15	16	16	17	17	18	18	19	19	20	21	21	22	22	23	23	24	24	25	25	26	27	27	28	28	
1	10	16	17	17	18	18	19	19	20	21	21	22	22	23	23	24	25	25	26	27	27	28	28	29	29	30	
1	20	17	17	18	19	19	20	20	21	21	22	23	23	24	25	25	26	26	27	28	28	29	29	30	30	31	
1	30	17	18	18	19	19	20	21	21	22	23	23	24	24	25	25	26	27	27	28	29	29	30	31	31	31	
		DIFFERENCE OF THE PROPORTIONAL LOGARITHMS IN THE EPHEMERIS.																									
		102	104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138							
h	m	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s	s							
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0							
0	10	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8	8	8							
0	20	13	13	13	13	14	14	14	14	15	15	15	15	15	15	15	16	16	16	16							
0	30	18	18	18	19	19	19	20	20	20	21	21	21	21	22	22	22	23	23	24							
0	40	22	22	23	23	24	24	25	25	25	26	26	26	27	27	28	28	28	29	29							
0	50	26	26	26	27	27	28	29	29	29	30	30	30	31	31	31	32	32	33	33							
1	0	28	29	29	30	30	31	31	32	33	33	34	34	35	35	36	37	37	38	38							
1	10	30	31	31	32	32	33	34	34	35	35	36	36	37	37	38	38	39	39	40							
1	20	31	32	33	33	34	34	35	35	36	36	37	38	38	39	39	40	40	41	41							
1	30	32	32	33	34	34	35	35	36	36	37	37	38	39	39	40	40	41	42	42							

The correction is to be added to the approximate Greenwich time when the proportional logarithms in the Ephemeris are decreasing, and subtracted when they are increasing.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.										
Side- real.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	0 0.000	0 9.830	0 19.659	0 29.489	0 39.318	0 49.148	0 58.977	1 8.807	0	0.000
1	0 0.164	0 9.993	0 19.823	0 29.653	0 39.482	0 49.312	0 59.141	1 8.971	1	0.003
2	0 0.328	0 10.157	0 19.987	0 29.816	0 39.646	0 49.475	0 59.305	1 9.135	2	0.005
3	0 0.491	0 10.321	0 20.151	0 29.980	0 39.810	0 49.639	0 59.469	1 9.298	3	0.008
4	0 0.655	0 10.485	0 20.314	0 30.144	0 39.974	0 49.803	0 59.633	1 9.462	4	0.011
5	0 0.819	0 10.649	0 20.478	0 30.308	0 40.137	0 49.967	0 59.796	1 9.626	5	0.014
6	0 0.983	0 10.813	0 20.642	0 30.472	0 40.301	0 50.131	0 59.960	1 9.790	6	0.016
7	0 1.147	0 10.976	0 20.806	0 30.635	0 40.465	0 50.295	1 0.124	1 9.954	7	0.019
8	0 1.311	0 11.140	0 20.970	0 30.799	0 40.629	0 50.458	1 0.288	1 10.118	8	0.022
9	0 1.474	0 11.304	0 21.134	0 30.963	0 40.793	0 50.622	1 0.452	1 10.281	9	0.025
10	0 1.638	0 11.468	0 21.297	0 31.127	0 40.956	0 50.786	1 0.616	1 10.445	10	0.027
11	0 1.802	0 11.632	0 21.461	0 31.291	0 41.120	0 50.950	1 0.779	1 10.609	11	0.030
12	0 1.966	0 11.795	0 21.625	0 31.455	0 41.284	0 51.114	1 0.943	1 10.773	12	0.033
13	0 2.130	0 11.959	0 21.789	0 31.618	0 41.448	0 51.278	1 1.107	1 10.937	13	0.035
14	0 2.294	0 12.123	0 21.953	0 31.782	0 41.612	0 51.441	1 1.271	1 11.100	14	0.038
15	0 2.457	0 12.287	0 22.117	0 31.946	0 41.776	0 51.605	1 1.435	1 11.264	15	0.041
16	0 2.621	0 12.451	0 22.280	0 32.110	0 41.939	0 51.769	1 1.599	1 11.428	16	0.044
17	0 2.785	0 12.615	0 22.444	0 32.274	0 42.103	0 51.933	1 1.762	1 11.592	17	0.046
18	0 2.949	0 12.778	0 22.608	0 32.438	0 42.267	0 52.097	1 1.926	1 11.756	18	0.049
19	0 3.113	0 12.942	0 22.772	0 32.601	0 42.431	0 52.260	1 2.090	1 11.920	19	0.052
20	0 3.277	0 13.106	0 22.936	0 32.765	0 42.595	0 52.424	1 2.254	1 12.083	20	0.055
21	0 3.440	0 13.270	0 23.099	0 32.929	0 42.759	0 52.588	1 2.418	1 12.247	21	0.057
22	0 3.604	0 13.434	0 23.263	0 33.093	0 42.922	0 52.752	1 2.582	1 12.411	22	0.060
23	0 3.768	0 13.598	0 23.427	0 33.257	0 43.086	0 52.916	1 2.745	1 12.575	23	0.063
24	0 3.932	0 13.761	0 23.591	0 33.420	0 43.250	0 53.080	1 2.909	1 12.739	24	0.066
25	0 4.096	0 13.925	0 23.755	0 33.584	0 43.414	0 53.243	1 3.073	1 12.903	25	0.068
26	0 4.259	0 14.089	0 23.919	0 33.748	0 43.578	0 53.407	1 3.237	1 13.066	26	0.071
27	0 4.423	0 14.253	0 24.082	0 33.912	0 43.742	0 53.571	1 3.401	1 13.230	27	0.074
28	0 4.587	0 14.417	0 24.246	0 34.076	0 43.905	0 53.735	1 3.564	1 13.394	28	0.076
29	0 4.751	0 14.581	0 24.410	0 34.240	0 44.069	0 53.899	1 3.728	1 13.558	29	0.079
30	0 4.915	0 14.744	0 24.574	0 34.403	0 44.233	0 54.063	1 3.892	1 13.722	30	0.082
31	0 5.079	0 14.908	0 24.738	0 34.567	0 44.397	0 54.226	1 4.056	1 13.886	31	0.085
32	0 5.242	0 15.072	0 24.902	0 34.731	0 44.561	0 54.390	1 4.220	1 14.049	32	0.087
33	0 5.406	0 15.236	0 25.065	0 34.895	0 44.724	0 54.554	1 4.384	1 14.213	33	0.090
34	0 5.570	0 15.400	0 25.229	0 35.059	0 44.888	0 54.718	1 4.547	1 14.377	34	0.093
35	0 5.734	0 15.563	0 25.393	0 35.223	0 45.052	0 54.882	1 4.711	1 14.541	35	0.096
36	0 5.898	0 15.727	0 25.557	0 35.386	0 45.216	0 55.046	1 4.875	1 14.705	36	0.098
37	0 6.062	0 15.891	0 25.721	0 35.550	0 45.380	0 55.209	1 5.039	1 14.868	37	0.101
38	0 6.225	0 16.055	0 25.885	0 35.714	0 45.544	0 55.373	1 5.203	1 15.032	38	0.104
39	0 6.389	0 16.219	0 26.048	0 35.878	0 45.707	0 55.537	1 5.367	1 15.196	39	0.106
40	0 6.553	0 16.383	0 26.212	0 36.042	0 45.871	0 55.701	1 5.530	1 15.360	40	0.109
41	0 6.717	0 16.546	0 26.376	0 36.206	0 46.035	0 55.865	1 5.694	1 15.524	41	0.112
42	0 6.881	0 16.710	0 26.540	0 36.369	0 46.199	0 56.028	1 5.858	1 15.688	42	0.115
43	0 7.045	0 16.874	0 26.704	0 36.533	0 46.363	0 56.192	1 6.022	1 15.851	43	0.117
44	0 7.208	0 17.038	0 26.867	0 36.697	0 46.527	0 56.356	1 6.186	1 16.015	44	0.120
45	0 7.372	0 17.202	0 27.031	0 36.861	0 46.690	0 56.520	1 6.350	1 16.179	45	0.123
46	0 7.536	0 17.366	0 27.195	0 37.025	0 46.854	0 56.684	1 6.513	1 16.343	46	0.126
47	0 7.700	0 17.529	0 27.359	0 37.188	0 47.018	0 56.848	1 6.677	1 16.507	47	0.128
48	0 7.864	0 17.693	0 27.523	0 37.352	0 47.182	0 57.011	1 6.841	1 16.671	48	0.131
49	0 8.027	0 17.857	0 27.687	0 37.516	0 47.346	0 57.175	1 7.005	1 16.834	49	0.134
50	0 8.191	0 18.021	0 27.850	0 37.680	0 47.510	0 57.339	1 7.169	1 16.998	50	0.137
51	0 8.355	0 18.185	0 28.014	0 37.844	0 47.673	0 57.503	1 7.332	1 17.162	51	0.139
52	0 8.519	0 18.349	0 28.178	0 38.008	0 47.837	0 57.667	1 7.496	1 17.326	52	0.142
53	0 8.683	0 18.512	0 28.342	0 38.171	0 48.001	0 57.831	1 7.660	1 17.490	53	0.145
54	0 8.847	0 18.676	0 28.506	0 38.335	0 48.165	0 57.994	1 7.824	1 17.654	54	0.147
55	0 9.010	0 18.840	0 28.670	0 38.499	0 48.329	0 58.158	1 7.988	1 17.817	55	0.150
56	0 9.174	0 19.004	0 28.833	0 38.663	0 48.492	0 58.322	1 8.152	1 17.981	56	0.153
57	0 9.338	0 19.168	0 28.997	0 38.827	0 48.656	0 58.486	1 8.315	1 18.145	57	0.156
58	0 9.502	0 19.331	0 29.161	0 38.991	0 48.820	0 58.650	1 8.479	1 18.309	58	0.158
59	0 9.666	0 19.495	0 29.325	0 39.154	0 48.984	0 58.814	1 8.643	1 18.473	59	0.161
Side- real.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.	

## TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.

Side- real.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	18.636	28.466	38.296	48.125	57.955	7.784	17.614	27.443	0.000
1	18.800	28.630	38.459	48.289	58.119	7.948	17.778	27.607	0.003
2	18.964	28.794	38.623	48.453	58.282	8.112	17.941	27.771	0.005
3	19.128	28.958	38.787	48.617	58.446	8.276	18.105	27.935	0.008
4	19.292	29.121	38.951	48.780	58.610	8.440	18.269	28.099	0.011
5	19.456	29.285	39.115	48.944	58.774	8.603	18.433	28.263	0.014
6	19.619	29.449	39.279	49.108	58.938	8.767	18.597	28.426	0.016
7	19.783	29.613	39.442	49.272	59.101	8.931	18.761	28.590	0.019
8	19.947	29.777	39.606	49.436	59.265	9.095	18.924	28.754	0.022
9	20.111	29.940	39.770	49.600	59.429	9.259	19.088	28.918	0.025
10	20.275	30.104	39.934	49.763	59.593	9.423	19.252	29.082	0.027
11	20.439	30.268	40.098	49.927	59.757	9.586	19.416	29.245	0.030
12	20.602	30.432	40.261	50.091	59.921	9.750	19.580	29.409	0.033
13	20.766	30.596	40.425	50.255	2.0084	9.914	19.744	29.573	0.035
14	20.930	30.760	40.589	50.419	2.0248	10.078	19.907	29.737	0.038
15	21.094	30.923	40.753	50.583	2.0412	10.242	20.071	29.901	0.041
16	21.258	31.087	40.917	50.746	2.0576	10.405	20.235	30.065	0.044
17	21.422	31.251	41.081	50.910	2.0740	10.569	20.399	30.228	0.046
18	21.585	31.415	41.244	51.074	2.0904	10.733	20.563	30.392	0.049
19	21.749	31.579	41.408	51.238	2.1067	10.897	20.727	30.556	0.052
20	21.913	31.743	41.572	51.402	2.1231	11.061	20.890	30.720	0.055
21	22.077	31.906	41.736	51.565	2.1395	11.225	21.054	30.884	0.057
22	22.241	32.070	41.900	51.729	2.1559	11.388	21.218	31.048	0.060
23	22.404	32.234	42.064	51.893	2.1723	11.552	21.382	31.211	0.063
24	22.568	32.398	42.227	52.057	2.1887	11.716	21.546	31.375	0.066
25	22.732	32.562	42.391	52.221	2.2050	11.880	21.709	31.539	0.068
26	22.896	32.726	42.555	52.385	2.2214	12.044	21.873	31.703	0.071
27	23.060	32.889	42.719	52.548	2.2378	12.208	22.037	31.867	0.074
28	23.224	33.053	42.883	52.712	2.2542	12.371	22.201	32.031	0.076
29	23.387	33.217	43.047	52.876	2.2706	12.535	22.365	32.194	0.079
30	23.551	33.381	43.210	53.040	2.2869	12.699	22.529	32.358	0.082
31	23.715	33.545	43.374	53.204	2.3033	12.863	22.693	32.522	0.085
32	23.879	33.708	43.538	53.368	2.3197	13.027	22.856	32.686	0.087
33	24.043	33.872	43.702	53.531	2.3361	13.191	23.020	32.850	0.090
34	24.207	34.036	43.866	53.695	2.3525	13.354	23.184	33.013	0.093
35	24.370	34.200	44.029	53.859	2.3689	13.518	23.348	33.177	0.096
36	24.534	34.364	44.193	54.023	2.3852	13.682	23.512	33.341	0.098
37	24.698	34.528	44.357	54.187	2.4016	13.846	23.675	33.505	0.101
38	24.862	34.691	44.521	54.351	2.4180	14.010	23.839	33.669	0.104
39	25.026	34.855	44.685	54.514	2.4344	14.173	24.003	33.833	0.106
40	25.190	35.019	44.849	54.678	2.4508	14.337	24.167	33.996	0.109
41	25.353	35.183	45.012	54.842	2.4672	14.501	24.331	34.160	0.112
42	25.517	35.347	45.176	55.006	2.4835	14.665	24.495	34.324	0.115
43	25.681	35.511	45.340	55.170	2.4999	14.829	24.658	34.488	0.117
44	25.845	35.674	45.504	55.333	2.5163	14.993	24.822	34.652	0.120
45	26.009	35.838	45.668	55.497	2.5327	15.156	24.986	34.816	0.123
46	26.172	36.002	45.832	55.661	2.5491	15.320	25.150	34.979	0.126
47	26.336	36.166	45.995	55.825	2.5655	15.484	25.314	35.143	0.128
48	26.500	36.330	46.159	55.989	2.5818	15.648	25.477	35.307	0.131
49	26.664	36.493	46.323	56.153	2.5982	15.812	25.641	35.471	0.134
50	26.828	36.657	46.487	56.316	2.6146	15.976	25.805	35.635	0.137
51	26.992	36.821	46.651	56.480	2.6310	16.139	25.969	35.798	0.139
52	27.155	36.985	46.815	56.644	2.6474	16.303	26.133	35.962	0.142
53	27.319	37.149	46.978	56.808	2.6637	16.467	26.297	36.126	0.145
54	27.483	37.313	47.142	56.972	2.6801	16.631	26.460	36.290	0.147
55	27.647	37.476	47.306	57.136	2.6965	16.795	26.624	36.454	0.150
56	27.811	37.640	47.470	57.299	2.7129	16.959	26.788	36.618	0.153
57	27.975	37.804	47.634	57.463	2.7293	17.122	26.952	36.781	0.156
58	28.138	37.968	47.797	57.627	2.7457	17.286	27.116	36.945	0.158
59	28.302	38.132	47.961	57.791	2.7620	17.450	27.280	37.109	0.161
Side- real.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.

TABLE II.—SIDEREAL INTO MEAN SOLAR TIME.

TO BE SUBTRACTED FROM A SIDEREAL TIME INTERVAL.									
Side- real.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.
m	m s	m s	m s	m s	m s	m s	m s	m s	s s
0	2 37.273	2 47.102	2 56.932	3 6.762	3 16.591	3 26.421	3 36.250	3 46.080	0 0.000
1	2 37.437	2 47.266	2 57.096	3 6.925	3 16.755	3 26.585	3 36.414	3 46.244	1 0.003
2	2 37.601	2 47.430	2 57.260	3 7.089	3 16.919	3 26.748	3 36.578	3 46.407	2 0.005
3	2 37.764	2 47.594	2 57.424	3 7.253	3 17.083	3 26.912	3 36.742	3 46.571	3 0.008
4	2 37.928	2 47.758	2 57.587	3 7.417	3 17.246	3 27.076	3 36.906	3 46.735	4 0.011
5	2 38.092	2 47.922	2 57.751	3 7.581	3 17.410	3 27.240	3 37.069	3 46.899	5 0.014
6	2 38.256	2 48.085	2 57.915	3 7.745	3 17.574	3 27.404	3 37.233	3 47.063	6 0.016
7	2 38.420	2 48.249	2 58.079	3 7.908	3 17.738	3 27.568	3 37.397	3 47.227	7 0.019
8	2 38.584	2 48.413	2 58.243	3 8.072	3 17.902	3 27.731	3 37.561	3 47.390	8 0.022
9	2 38.747	2 48.577	2 58.406	3 8.236	3 18.066	3 27.895	3 37.725	3 47.554	9 0.025
10	2 38.911	2 48.741	2 58.570	3 8.400	3 18.229	3 28.059	3 37.889	3 47.718	10 0.027
11	2 39.075	2 48.905	2 58.734	3 8.564	3 18.393	3 28.223	3 38.052	3 47.882	11 0.030
12	2 39.239	2 49.068	2 58.898	3 8.728	3 18.557	3 28.387	3 38.216	3 48.046	12 0.033
13	2 39.403	2 49.232	2 59.062	3 8.891	3 18.721	3 28.550	3 38.380	3 48.210	13 0.035
14	2 39.566	2 49.396	2 59.226	3 9.055	3 18.885	3 28.714	3 38.544	3 48.373	14 0.038
15	2 39.730	2 49.560	2 59.389	3 9.219	3 19.049	3 28.878	3 38.708	3 48.537	15 0.041
16	2 39.894	2 49.724	2 59.553	3 9.383	3 19.212	3 29.042	3 38.871	3 48.701	16 0.044
17	2 40.058	2 49.888	2 59.717	3 9.547	3 19.376	3 29.206	3 39.035	3 48.865	17 0.046
18	2 40.222	2 50.051	2 59.881	3 9.710	3 19.540	3 29.370	3 39.199	3 49.029	18 0.049
19	2 40.386	2 50.215	3 0.045	3 9.874	3 19.704	3 29.533	3 39.363	3 49.193	19 0.052
20	2 40.549	2 50.379	3 0.209	3 10.038	3 19.868	3 29.697	3 39.527	3 49.356	20 0.055
21	2 40.713	2 50.543	3 0.372	3 10.202	3 20.032	3 29.861	3 39.691	3 49.520	21 0.057
22	2 40.877	2 50.707	3 0.536	3 10.366	3 20.195	3 30.025	3 39.854	3 49.684	22 0.060
23	2 41.041	2 50.870	3 0.700	3 10.530	3 20.359	3 30.189	3 40.018	3 49.848	23 0.063
24	2 41.205	2 51.034	3 0.864	3 10.693	3 20.523	3 30.353	3 40.182	3 50.012	24 0.066
25	2 41.369	2 51.198	3 1.028	3 10.857	3 20.687	3 30.516	3 40.346	3 50.175	25 0.068
26	2 41.532	2 51.362	3 1.192	3 11.021	3 20.851	3 30.680	3 40.510	3 50.339	26 0.071
27	2 41.696	2 51.526	3 1.355	3 11.185	3 21.014	3 30.844	3 40.674	3 50.503	27 0.074
28	2 41.860	2 51.690	3 1.519	3 11.349	3 21.178	3 31.008	3 40.837	3 50.667	28 0.076
29	2 42.024	2 51.853	3 1.683	3 11.513	3 21.342	3 31.172	3 41.001	3 50.831	29 0.079
30	2 42.188	2 52.017	3 1.847	3 11.676	3 21.506	3 31.336	3 41.165	3 50.995	30 0.082
31	2 42.352	2 52.181	3 2.011	3 11.840	3 21.670	3 31.499	3 41.329	3 51.158	31 0.085
32	2 42.515	2 52.345	3 2.174	3 12.004	3 21.834	3 31.663	3 41.493	3 51.322	32 0.087
33	2 42.679	2 52.509	3 2.338	3 12.168	3 21.997	3 31.827	3 41.657	3 51.486	33 0.090
34	2 42.843	2 52.673	3 2.502	3 12.332	3 22.161	3 31.991	3 41.820	3 51.650	34 0.093
35	2 43.007	2 52.836	3 2.666	3 12.496	3 22.325	3 32.155	3 41.984	3 51.814	35 0.096
36	2 43.171	2 53.000	3 2.830	3 12.659	3 22.489	3 32.318	3 42.148	3 51.978	36 0.098
37	2 43.334	2 53.164	3 2.994	3 12.823	3 22.653	3 32.482	3 42.312	3 52.141	37 0.101
38	2 43.498	2 53.328	3 3.157	3 12.987	3 22.817	3 32.646	3 42.476	3 52.305	38 0.104
39	2 43.662	2 53.492	3 3.321	3 13.151	3 22.980	3 32.810	3 42.639	3 52.469	39 0.106
40	2 43.826	2 53.656	3 3.485	3 13.315	3 23.144	3 32.974	3 42.803	3 52.633	40 0.109
41	2 43.990	2 53.819	3 3.649	3 13.478	3 23.308	3 33.138	3 42.967	3 52.797	41 0.112
42	2 44.154	2 53.983	3 3.813	3 13.642	3 23.472	3 33.301	3 43.131	3 52.961	42 0.115
43	2 44.317	2 54.147	3 3.977	3 13.805	3 23.636	3 33.465	3 43.295	3 53.124	43 0.117
44	2 44.481	2 54.311	3 4.140	3 13.970	3 23.800	3 33.629	3 43.459	3 53.288	44 0.120
45	2 44.645	2 54.475	3 4.304	3 14.134	3 23.963	3 33.793	3 43.622	3 53.452	45 0.123
46	2 44.809	2 54.638	3 4.468	3 14.298	3 24.127	3 33.957	3 43.786	3 53.616	46 0.126
47	2 44.973	2 54.802	3 4.632	3 14.461	3 24.291	3 34.121	3 43.950	3 53.780	47 0.128
48	2 45.137	2 54.966	3 4.796	3 14.625	3 24.455	3 34.284	3 44.114	3 53.943	48 0.131
49	2 45.300	2 55.130	3 4.960	3 14.789	3 24.619	3 34.448	3 44.278	3 54.107	49 0.134
50	2 45.464	2 55.294	3 5.123	3 14.953	3 24.782	3 34.612	3 44.442	3 54.271	50 0.137
51	2 45.628	2 55.458	3 5.287	3 15.117	3 24.946	3 34.776	3 44.605	3 54.435	51 0.139
52	2 45.792	2 55.621	3 5.451	3 15.281	3 25.110	3 34.940	3 44.769	3 54.599	52 0.142
53	2 45.956	2 55.785	3 5.615	3 15.444	3 25.274	3 35.104	3 44.933	3 54.763	53 0.145
54	2 46.120	2 55.949	3 5.779	3 15.608	3 25.438	3 35.267	3 45.097	3 54.926	54 0.147
55	2 46.283	2 56.113	3 5.942	3 15.772	3 25.602	3 35.431	3 45.261	3 55.090	55 0.150
56	2 46.447	2 56.277	3 6.106	3 15.936	3 25.765	3 35.595	3 45.425	3 55.254	56 0.153
57	2 46.611	2 56.441	3 6.270	3 16.100	3 25.929	3 35.759	3 45.588	3 55.418	57 0.156
58	2 46.775	2 56.604	3 6.434	3 16.264	3 26.093	3 35.923	3 45.752	3 55.582	58 0.158
59	2 46.939	2 56.768	3 6.598	3 16.427	3 26.257	3 36.086	3 45.916	3 55.746	59 0.161
Side- real.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.

TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

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TO BE ADDED TO A MEAN TIME INTERVAL.										
Mean Solar.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.	
m	m s	m s	m s	m s	m s	m s	m s	m s	s	s
0	0 0.000	0 9.856	0 19.713	0 29.569	0 39.426	0 49.282	0 59.139	1 8.995	0	0.000
1	0 0.164	0 10.021	0 19.877	0 29.734	0 39.590	0 49.447	0 59.303	1 9.160	1	0.003
2	0 0.329	0 10.185	0 20.041	0 29.898	0 39.754	0 49.611	0 59.467	1 9.324	2	0.005
3	0 0.493	0 10.349	0 20.206	0 30.062	0 39.919	0 49.775	0 59.632	1 9.488	3	0.008
4	0 0.657	0 10.514	0 20.370	0 30.227	0 40.083	0 49.939	0 59.796	1 9.652	4	0.011
5	0 0.821	0 10.678	0 20.534	0 30.391	0 40.247	0 50.104	0 59.960	1 9.817	5	0.014
6	0 0.986	0 10.842	0 20.699	0 30.555	0 40.412	0 50.268	1 0.124	1 9.981	6	0.016
7	0 1.150	0 11.006	0 20.863	0 30.719	0 40.576	0 50.432	1 0.289	1 10.145	7	0.019
8	0 1.314	0 11.171	0 21.027	0 30.884	0 40.740	0 50.597	1 0.453	1 10.310	8	0.022
9	0 1.478	0 11.335	0 21.191	0 31.048	0 40.904	0 50.761	1 0.617	1 10.474	9	0.025
10	0 1.643	0 11.499	0 21.356	0 31.212	0 41.069	0 50.925	1 0.782	1 10.638	10	0.027
11	0 1.807	0 11.663	0 21.520	0 31.376	0 41.233	0 51.089	1 0.946	1 10.802	11	0.030
12	0 1.971	0 11.828	0 21.684	0 31.541	0 41.397	0 51.254	1 1.110	1 10.967	12	0.033
13	0 2.136	0 11.992	0 21.849	0 31.705	0 41.561	0 51.418	1 1.274	1 11.131	13	0.036
14	0 2.300	0 12.156	0 22.013	0 31.869	0 41.726	0 51.582	1 1.439	1 11.295	14	0.038
15	0 2.464	0 12.321	0 22.177	0 32.034	0 41.890	0 51.746	1 1.603	1 11.459	15	0.041
16	0 2.628	0 12.485	0 22.341	0 32.198	0 42.054	0 51.911	1 1.767	1 11.624	16	0.044
17	0 2.793	0 12.649	0 22.506	0 32.362	0 42.219	0 52.075	1 1.932	1 11.788	17	0.047
18	0 2.957	0 12.813	0 22.670	0 32.526	0 42.383	0 52.239	1 2.096	1 11.952	18	0.049
19	0 3.121	0 12.978	0 22.834	0 32.691	0 42.547	0 52.404	1 2.260	1 12.117	19	0.052
20	0 3.285	0 13.142	0 22.998	0 32.855	0 42.711	0 52.568	1 2.424	1 12.281	20	0.055
21	0 3.450	0 13.306	0 23.163	0 33.019	0 42.876	0 52.732	1 2.589	1 12.445	21	0.057
22	0 3.614	0 13.471	0 23.327	0 33.183	0 43.040	0 52.896	1 2.753	1 12.609	22	0.060
23	0 3.778	0 13.635	0 23.491	0 33.348	0 43.204	0 53.061	1 2.917	1 12.774	23	0.063
24	0 3.943	0 13.799	0 23.656	0 33.512	0 43.368	0 53.225	1 3.081	1 12.938	24	0.066
25	0 4.107	0 13.963	0 23.820	0 33.676	0 43.533	0 53.389	1 3.246	1 13.102	25	0.068
26	0 4.271	0 14.128	0 23.984	0 33.841	0 43.697	0 53.554	1 3.410	1 13.266	26	0.071
27	0 4.435	0 14.292	0 24.148	0 34.005	0 43.861	0 53.718	1 3.574	1 13.431	27	0.074
28	0 4.600	0 14.456	0 24.313	0 34.169	0 44.026	0 53.882	1 3.739	1 13.595	28	0.077
29	0 4.764	0 14.620	0 24.477	0 34.333	0 44.190	0 54.046	1 3.903	1 13.759	29	0.079
30	0 4.928	0 14.785	0 24.641	0 34.498	0 44.354	0 54.211	1 4.067	1 13.924	30	0.082
31	0 5.093	0 14.949	0 24.805	0 34.662	0 44.518	0 54.375	1 4.231	1 14.088	31	0.085
32	0 5.257	0 15.113	0 24.970	0 34.826	0 44.683	0 54.539	1 4.396	1 14.252	32	0.088
33	0 5.421	0 15.278	0 25.134	0 34.990	0 44.847	0 54.703	1 4.560	1 14.416	33	0.090
34	0 5.585	0 15.442	0 25.298	0 35.155	0 45.011	0 54.868	1 4.724	1 14.581	34	0.093
35	0 5.750	0 15.606	0 25.463	0 35.319	0 45.176	0 55.032	1 4.888	1 14.745	35	0.096
36	0 5.914	0 15.770	0 25.627	0 35.483	0 45.340	0 55.196	1 5.053	1 14.909	36	0.099
37	0 6.078	0 15.935	0 25.791	0 35.648	0 45.504	0 55.361	1 5.217	1 15.073	37	0.101
38	0 6.242	0 16.099	0 25.955	0 35.812	0 45.668	0 55.525	1 5.381	1 15.238	38	0.104
39	0 6.407	0 16.263	0 26.120	0 35.976	0 45.833	0 55.689	1 5.546	1 15.402	39	0.107
40	0 6.571	0 16.427	0 26.284	0 36.140	0 45.997	0 55.853	1 5.710	1 15.566	40	0.110
41	0 6.735	0 16.592	0 26.448	0 36.305	0 46.161	0 56.018	1 5.874	1 15.731	41	0.112
42	0 6.900	0 16.756	0 26.612	0 36.469	0 46.325	0 56.182	1 6.038	1 15.895	42	0.115
43	0 7.064	0 16.920	0 26.777	0 36.633	0 46.490	0 56.346	1 6.203	1 16.059	43	0.118
44	0 7.228	0 17.085	0 26.941	0 36.798	0 46.654	0 56.510	1 6.367	1 16.223	44	0.120
45	0 7.392	0 17.249	0 27.105	0 36.962	0 46.818	0 56.675	1 6.531	1 16.388	45	0.123
46	0 7.557	0 17.413	0 27.270	0 37.126	0 46.983	0 56.839	1 6.695	1 16.552	46	0.126
47	0 7.721	0 17.577	0 27.434	0 37.290	0 47.147	0 57.003	1 6.860	1 16.716	47	0.129
48	0 7.885	0 17.742	0 27.598	0 37.455	0 47.311	0 57.168	1 7.024	1 16.881	48	0.131
49	0 8.049	0 17.906	0 27.762	0 37.619	0 47.475	0 57.332	1 7.188	1 17.045	49	0.134
50	0 8.214	0 18.070	0 27.927	0 37.783	0 47.640	0 57.496	1 7.353	1 17.209	50	0.137
51	0 8.378	0 18.234	0 28.091	0 37.947	0 47.804	0 57.660	1 7.517	1 17.373	51	0.140
52	0 8.542	0 18.399	0 28.255	0 38.112	0 47.968	0 57.825	1 7.681	1 17.538	52	0.142
53	0 8.707	0 18.563	0 28.420	0 38.276	0 48.132	0 57.989	1 7.845	1 17.702	53	0.145
54	0 8.871	0 18.727	0 28.584	0 38.440	0 48.297	0 58.153	1 8.010	1 17.866	54	0.148
55	0 9.035	0 18.892	0 28.748	0 38.605	0 48.461	0 58.317	1 8.174	1 18.030	55	0.151
56	0 9.199	0 19.056	0 28.912	0 38.769	0 48.625	0 58.482	1 8.338	1 18.195	56	0.153
57	0 9.364	0 19.220	0 29.077	0 38.933	0 48.790	0 58.646	1 8.502	1 18.359	57	0.156
58	0 9.528	0 19.384	0 29.241	0 39.097	0 48.954	0 58.810	1 8.667	1 18.523	58	0.159
59	0 9.692	0 19.549	0 29.405	0 39.262	0 49.118	0 58.975	1 8.831	1 18.688	59	0.162
Mean Solar.	0 <sup>h</sup> .	1 <sup>h</sup> .	2 <sup>h</sup> .	3 <sup>h</sup> .	4 <sup>h</sup> .	5 <sup>h</sup> .	6 <sup>h</sup> .	7 <sup>h</sup> .	For Seconds.	

TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

TO BE ADDED TO A MEAN TIME INTERVAL.									
Mean Solar.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.
0	18.852	18.708	18.565	18.421	18.278	18.134	17.991	17.847	0.000
1	19.016	18.873	18.729	18.585	18.442	18.298	18.155	18.011	0.003
2	19.180	19.037	18.893	18.750	18.606	18.463	18.319	18.176	0.005
3	19.345	19.201	19.058	18.914	18.771	18.627	18.483	18.340	0.008
4	19.509	19.365	19.222	19.078	18.935	18.791	18.648	18.504	0.011
5	19.673	19.530	19.386	19.243	19.099	18.956	18.812	18.668	0.014
6	19.837	19.694	19.550	19.407	19.263	19.120	18.976	18.833	0.016
7	20.002	19.858	19.715	19.571	19.428	19.284	19.141	18.997	0.019
8	20.166	20.022	19.879	19.735	19.592	19.448	19.305	19.161	0.022
9	20.330	20.187	20.043	19.900	19.756	19.613	19.469	19.326	0.025
10	20.495	20.351	20.207	20.064	19.920	19.777	19.633	19.490	0.027
11	20.659	20.515	20.372	20.228	20.085	19.941	19.798	19.654	0.030
12	20.823	20.680	20.536	20.393	20.249	20.105	19.962	19.818	0.033
13	20.987	20.844	20.700	20.557	20.413	20.270	20.126	19.983	0.036
14	21.152	21.008	20.865	20.721	20.578	20.434	20.290	20.147	0.038
15	21.316	21.172	21.029	20.885	20.742	20.598	20.455	20.311	0.041
16	21.480	21.337	21.193	21.050	20.906	20.763	20.619	20.476	0.044
17	21.644	21.501	21.357	21.214	21.070	20.927	20.783	20.640	0.047
18	21.809	21.665	21.522	21.378	21.235	21.091	20.948	20.804	0.049
19	21.973	21.829	21.686	21.542	21.399	21.255	21.112	20.968	0.052
20	22.137	21.994	21.850	21.707	21.563	21.420	21.276	21.133	0.055
21	22.302	22.158	22.015	21.871	21.727	21.584	21.440	21.297	0.057
22	22.466	22.322	22.179	22.035	21.892	21.748	21.605	21.461	0.060
23	22.630	22.487	22.343	22.200	22.056	21.912	21.769	21.625	0.063
24	22.794	22.651	22.507	22.364	22.220	22.077	21.933	21.790	0.066
25	22.959	22.815	22.672	22.528	22.385	22.241	22.098	21.954	0.068
26	23.123	22.979	22.836	22.692	22.549	22.405	22.262	22.118	0.071
27	23.287	23.144	23.000	22.857	22.713	22.570	22.426	22.283	0.074
28	23.451	23.308	23.164	23.021	22.877	22.734	22.590	22.447	0.077
29	23.616	23.472	23.329	23.185	23.042	22.898	22.755	22.611	0.079
30	23.780	23.637	23.493	23.349	23.206	23.062	22.919	22.775	0.082
31	23.944	23.801	23.657	23.514	23.370	23.227	23.083	22.940	0.085
32	24.109	23.965	23.822	23.678	23.534	23.391	23.247	23.104	0.088
33	24.273	24.129	23.986	23.842	23.699	23.555	23.412	23.268	0.090
34	24.437	24.294	24.150	24.007	23.863	23.720	23.576	23.432	0.093
35	24.601	24.458	24.314	24.171	24.027	23.884	23.740	23.597	0.096
36	24.766	24.622	24.479	24.335	24.192	24.048	23.905	23.761	0.099
37	24.930	24.786	24.643	24.499	24.356	24.212	24.069	23.925	0.101
38	25.094	24.951	24.807	24.664	24.520	24.377	24.233	24.090	0.104
39	25.259	25.115	24.971	24.828	24.684	24.541	24.397	24.254	0.107
40	25.423	25.279	25.136	24.992	24.849	24.705	24.562	24.418	0.110
41	25.587	25.444	25.300	25.156	25.013	24.869	24.726	24.582	0.112
42	25.751	25.608	25.464	25.321	25.177	25.034	24.890	24.747	0.115
43	25.916	25.772	25.629	25.485	25.342	25.198	25.054	24.911	0.118
44	26.080	25.936	25.793	25.649	25.506	25.362	25.219	25.075	0.120
45	26.244	26.101	25.957	25.814	25.670	25.527	25.383	25.239	0.123
46	26.408	26.265	26.121	25.978	25.834	25.691	25.547	25.404	0.126
47	26.573	26.429	26.286	26.142	25.999	25.855	25.712	25.568	0.129
48	26.737	26.593	26.450	26.306	26.163	26.019	25.876	25.732	0.131
49	26.901	26.758	26.614	26.471	26.327	26.184	26.040	25.897	0.134
50	27.066	26.922	26.778	26.635	26.491	26.348	26.204	26.061	0.137
51	27.230	27.086	26.943	26.799	26.656	26.512	26.369	26.225	0.140
52	27.394	27.251	27.107	26.964	26.820	26.676	26.533	26.389	0.142
53	27.558	27.415	27.271	27.128	26.984	26.841	26.697	26.554	0.145
54	27.723	27.579	27.436	27.292	27.149	27.005	26.861	26.718	0.148
55	27.887	27.743	27.600	27.456	27.313	27.169	27.026	26.882	0.151
56	28.051	27.908	27.764	27.621	27.477	27.334	27.190	27.047	0.153
57	28.215	28.072	27.928	27.785	27.641	27.498	27.354	27.211	0.156
58	28.380	28.236	28.093	27.949	27.806	27.662	27.519	27.375	0.159
59	28.544	28.400	28.257	28.113	27.970	27.826	27.683	27.539	0.162
Mean Solar.	8 <sup>h</sup> .	9 <sup>h</sup> .	10 <sup>h</sup> .	11 <sup>h</sup> .	12 <sup>h</sup> .	13 <sup>h</sup> .	14 <sup>h</sup> .	15 <sup>h</sup> .	For Seconds.



TABLE III.—MEAN SOLAR INTO SIDEREAL TIME.

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TO BE ADDED TO A MEAN TIME INTERVAL.									
Mean Solar.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.
m	m	m	m	m	m	m	m	m	s
0	2 37.704	2 47.560	2 57.417	3 7.273	3 17.129	3 26.986	3 36.842	3 46.699	0 0.000
1	2 37.868	2 47.724	2 57.581	3 7.437	3 17.294	3 27.150	3 37.007	3 46.863	1 0.003
2	2 38.032	2 47.889	2 57.745	3 7.602	3 17.458	3 27.315	3 37.171	3 47.027	2 0.005
3	2 38.196	2 48.053	2 57.909	3 7.766	3 17.622	3 27.479	3 37.335	3 47.192	3 0.008
4	2 38.361	2 48.217	2 58.074	3 7.930	3 17.787	3 27.643	3 37.500	3 47.356	4 0.011
5	2 38.525	2 48.381	2 58.238	3 8.094	3 17.951	3 27.807	3 37.664	3 47.520	5 0.014
6	2 38.689	2 48.546	2 58.402	3 8.259	3 18.115	3 27.972	3 37.828	3 47.685	6 0.016
7	2 38.854	2 48.710	2 58.566	3 8.423	3 18.279	3 28.136	3 37.992	3 47.849	7 0.019
8	2 39.018	2 48.874	2 58.731	3 8.587	3 18.444	3 28.300	3 38.157	3 48.013	8 0.022
9	2 39.182	2 49.039	2 58.895	3 8.751	3 18.608	3 28.464	3 38.321	3 48.177	9 0.025
10	2 39.346	2 49.203	2 59.059	3 8.916	3 18.772	3 28.629	3 38.485	3 48.342	10 0.027
11	2 39.511	2 49.367	2 59.224	3 9.080	3 18.937	3 28.793	3 38.649	3 48.506	11 0.030
12	2 39.675	2 49.531	2 59.388	3 9.244	3 19.101	3 28.957	3 38.814	3 48.670	12 0.033
13	2 39.839	2 49.696	2 59.552	3 9.409	3 19.265	3 29.122	3 38.978	3 48.834	13 0.036
14	2 40.003	2 49.860	2 59.716	3 9.573	3 19.429	3 29.286	3 39.142	3 48.999	14 0.038
15	2 40.168	2 50.024	2 59.881	3 9.737	3 19.594	3 29.450	3 39.307	3 49.163	15 0.041
16	2 40.332	2 50.188	3 0.045	3 9.901	3 19.758	3 29.614	3 39.471	3 49.327	16 0.044
17	2 40.496	2 50.353	3 0.209	3 10.066	3 19.922	3 29.779	3 39.635	3 49.492	17 0.047
18	2 40.661	2 50.517	3 0.373	3 10.230	3 20.086	3 29.943	3 39.799	3 49.656	18 0.049
19	2 40.825	2 50.681	3 0.538	3 10.394	3 20.251	3 30.107	3 39.964	3 49.820	19 0.052
20	2 40.989	2 50.846	3 0.702	3 10.559	3 20.415	3 30.271	3 40.128	3 49.984	20 0.055
21	2 41.153	2 51.010	3 0.866	3 10.723	3 20.579	3 30.436	3 40.292	3 50.149	21 0.057
22	2 41.318	2 51.174	3 1.031	3 10.887	3 20.744	3 30.600	3 40.456	3 50.313	22 0.060
23	2 41.482	2 51.338	3 1.195	3 11.051	3 20.908	3 30.764	3 40.621	3 50.477	23 0.063
24	2 41.646	2 51.503	3 1.359	3 11.216	3 21.072	3 30.929	3 40.785	3 50.642	24 0.066
25	2 41.810	2 51.667	3 1.523	3 11.380	3 21.236	3 31.093	3 40.949	3 50.806	25 0.068
26	2 41.975	2 51.831	3 1.688	3 11.544	3 21.401	3 31.257	3 41.114	3 50.970	26 0.071
27	2 42.139	2 51.995	3 1.852	3 11.708	3 21.565	3 31.421	3 41.278	3 51.134	27 0.074
28	2 42.303	2 52.160	3 2.016	3 11.873	3 21.729	3 31.586	3 41.442	3 51.299	28 0.077
29	2 42.468	2 52.324	3 2.181	3 12.037	3 21.893	3 31.750	3 41.606	3 51.463	29 0.079
30	2 42.632	2 52.488	3 2.345	3 12.201	3 22.058	3 31.914	3 41.771	3 51.627	30 0.082
31	2 42.796	2 52.653	3 2.509	3 12.366	3 22.222	3 32.078	3 41.935	3 51.791	31 0.085
32	2 42.960	2 52.817	3 2.673	3 12.530	3 22.386	3 32.243	3 42.099	3 51.956	32 0.088
33	2 43.125	2 52.981	3 2.838	3 12.694	3 22.551	3 32.407	3 42.264	3 52.120	33 0.090
34	2 43.289	2 53.145	3 3.002	3 12.858	3 22.715	3 32.571	3 42.428	3 52.284	34 0.093
35	2 43.453	2 53.310	3 3.166	3 13.023	3 22.879	3 32.736	3 42.592	3 52.449	35 0.096
36	2 43.617	2 53.474	3 3.330	3 13.187	3 23.043	3 32.900	3 42.756	3 52.613	36 0.099
37	2 43.782	2 53.638	3 3.495	3 13.351	3 23.208	3 33.064	3 42.921	3 52.777	37 0.101
38	2 43.946	2 53.803	3 3.659	3 13.515	3 23.372	3 33.228	3 43.085	3 52.941	38 0.104
39	2 44.110	2 53.967	3 3.823	3 13.680	3 23.536	3 33.393	3 43.249	3 53.106	39 0.107
40	2 44.275	2 54.131	3 3.988	3 13.844	3 23.700	3 33.557	3 43.413	3 53.270	40 0.110
41	2 44.439	2 54.295	3 4.152	3 14.008	3 23.865	3 33.721	3 43.578	3 53.434	41 0.112
42	2 44.603	2 54.460	3 4.316	3 14.173	3 24.029	3 33.886	3 43.742	3 53.598	42 0.115
43	2 44.767	2 54.624	3 4.480	3 14.337	3 24.193	3 34.050	3 43.906	3 53.763	43 0.118
44	2 44.932	2 54.788	3 4.645	3 14.501	3 24.358	3 34.214	3 44.071	3 53.927	44 0.120
45	2 45.096	2 54.952	3 4.809	3 14.665	3 24.522	3 34.378	3 44.235	3 54.091	45 0.123
46	2 45.260	2 55.117	3 4.973	3 14.830	3 24.686	3 34.543	3 44.399	3 54.256	46 0.126
47	2 45.425	2 55.281	3 5.137	3 14.994	3 24.850	3 34.707	3 44.563	3 54.420	47 0.129
48	2 45.589	2 55.445	3 5.302	3 15.158	3 25.015	3 34.871	3 44.728	3 54.584	48 0.131
49	2 45.753	2 55.610	3 5.466	3 15.322	3 25.179	3 35.035	3 44.892	3 54.748	49 0.134
50	2 45.917	2 55.774	3 5.630	3 15.487	3 25.343	3 35.200	3 45.056	3 54.913	50 0.137
51	2 46.082	2 55.938	3 5.795	3 15.651	3 25.508	3 35.364	3 45.220	3 55.077	51 0.140
52	2 46.246	2 56.102	3 5.959	3 15.815	3 25.672	3 35.528	3 45.385	3 55.241	52 0.142
53	2 46.410	2 56.267	3 6.123	3 15.980	3 25.836	3 35.693	3 45.549	3 55.405	53 0.145
54	2 46.574	2 56.431	3 6.287	3 16.144	3 26.000	3 35.857	3 45.713	3 55.570	54 0.148
55	2 46.739	2 56.595	3 6.452	3 16.308	3 26.165	3 36.021	3 45.878	3 55.734	55 0.151
56	2 46.903	2 56.759	3 6.616	3 16.472	3 26.329	3 36.185	3 46.042	3 55.898	56 0.153
57	2 47.067	2 56.924	3 6.780	3 16.637	3 26.493	3 36.350	3 46.206	3 56.063	57 0.156
58	2 47.232	2 57.088	3 6.944	3 16.801	3 26.657	3 36.514	3 46.370	3 56.227	58 0.159
59	2 47.396	2 57.252	3 7.109	3 16.965	3 26.822	3 36.678	3 46.535	3 56.391	59 0.162
Mean Solar.	16 <sup>h</sup> .	17 <sup>h</sup> .	18 <sup>h</sup> .	19 <sup>h</sup> .	20 <sup>h</sup> .	21 <sup>h</sup> .	22 <sup>h</sup> .	23 <sup>h</sup> .	For Seconds.

TABLE FOR FINDING THE LATITUDE BY AN OBSERVED ALTITUDE OF POLARIS.

Reduce the observed altitude of Polaris to the true altitude.

Reduce the recorded time of observation to the local sidereal time.

If the sidereal time is { less than 1<sup>h</sup> 21<sup>m</sup>.8, subtract it from 1<sup>h</sup> 21<sup>m</sup>.8;  
between 1<sup>h</sup> 21<sup>m</sup>.8 and 13<sup>h</sup> 21<sup>m</sup>.8, subtract 1<sup>h</sup> 21<sup>m</sup>.8 from it;  
greater than 13<sup>h</sup> 21<sup>m</sup>.8, subtract it from 25<sup>h</sup> 21<sup>m</sup>.8;

and the remainder is the hour-angle of Polaris.

With this hour-angle take out the correction from Table IV (below), and add it to or subtract it from the true altitude, according to its sign. The result is the approximate latitude of the place.

Example.—1898, October 1, at 10<sup>h</sup> 40<sup>m</sup> 30<sup>s</sup>, P. M., mean solar time, in longitude 29° east of Greenwich, suppose the true altitude of Polaris to be 43° 20': required the latitude of the place.

Local astronomical mean time	h	m	s
Reduction from Table III, for 10 <sup>h</sup> 40 <sup>m</sup> 30 <sup>s</sup>	10	40	30
Greenwich sidereal time of mean noon, October 1, page 165	+	1	45
Reduction from Table III, for longitude (= 1 <sup>h</sup> 56 <sup>m</sup> east, or minus)	12	40	58
	—	0	19
Sum (having regard to signs) is equal to local sidereal time	23	22	54
Subtract sidereal time	25	21	48
Remainder is equal to hour-angle of Polaris	23	22	54
	1	58	54
True altitude	+	43	20
Correction from Table IV (below)	—	1	4
Approximate Latitude	+	42	16

TABLE IV.—1898.

Hour-Angle.	0 <sup>h</sup>	1 <sup>h</sup>	2 <sup>h</sup>	3 <sup>h</sup>	4 <sup>h</sup>	5 <sup>h</sup>
m						
0	− 1 13.9	− 1 11.3	− 1 3.8	− 0 51.9	− 0 36.4	− 0 18.4
5	1 13.9 0.0	1 10.9 0.4	1 3.0 0.8	0 50.7 1.2	0 35.0 1.4	0 16.9 1.3
10	1 13.8 0.1	1 10.4 0.5	1 2.1 0.9	0 49.5 1.2	0 33.6 1.4	0 15.3 1.6
15	1 13.7 0.1	1 9.9 0.5	1 1.2 0.9	0 48.3 1.2	0 32.1 1.5	0 13.7 1.6
20	− 1 13.6 0.1	− 1 9.4 0.6	− 1 0.3 1.0	− 0 47.1 1.3	− 0 30.6 1.5	− 0 12.1 1.6
25	1 13.5 0.2	1 8.8 0.6	0 59.3 1.0	0 45.8 1.3	0 29.1 1.5	0 10.5 1.6
30	1 13.3 0.2	1 8.2 0.7	0 58.3 1.0	0 44.5 1.3	0 27.6 1.5	0 8.9 1.6
35	1 13.1 0.3	1 7.5 0.7	0 57.3 1.0	0 43.2 1.3	0 26.1 1.5	0 7.3 1.6
40	− 1 12.8 0.3	− 1 6.8 0.7	− 0 56.3 1.1	− 0 41.9 1.4	− 0 24.6 1.5	− 0 5.7 1.6
45	1 12.5 0.4	1 6.1 0.7	0 55.2 1.1	0 40.5 1.3	0 23.1 1.5	0 4.1 1.6
50	1 12.1 0.4	1 5.4 0.8	0 54.1 1.1	0 39.2 1.4	0 21.6 1.5	0 2.5 1.6
55	1 11.7 0.4	1 4.6 0.8	0 53.0 1.1	0 37.8 1.4	0 20.0 1.6	− 0 0.9 1.7
60	− 1 11.3 0.4	− 1 3.8 0.8	− 0 51.9 1.1	− 0 36.4 1.4	− 0 18.4 1.6	+ 0 0.8 1.7
Hour-Angle.	6 <sup>h</sup>	7 <sup>h</sup>	8 <sup>h</sup>	9 <sup>h</sup>	10 <sup>h</sup>	11 <sup>h</sup>
m						
0	+ 0 0.8	+ 0 19.8	+ 0 37.6	+ 0 52.6	+ 1 4.2	+ 1 11.4
5	0 2.4 1.6	0 21.4 1.6	0 39.0 1.4	0 53.7 1.1	1 5.0 0.8	1 11.8 0.4
10	0 4.0 1.6	0 22.9 1.5	0 40.3 1.3	0 54.8 1.1	1 5.7 0.7	1 12.2 0.4
15	0 5.6 1.6	0 24.5 1.6	0 41.6 1.3	0 55.9 1.1	1 6.4 0.7	1 12.5 0.3
20	+ 0 7.2 1.6	+ 0 26.0 1.5	+ 0 42.9 1.3	+ 0 56.9 1.0	+ 1 7.1 0.7	+ 1 12.8 0.3
25	0 8.8 1.6	0 27.5 1.5	0 44.2 1.3	0 57.9 1.0	1 7.8 0.6	1 13.1 0.2
30	0 10.4 1.6	0 29.0 1.5	0 45.5 1.3	0 58.9 1.0	1 8.4 0.5	1 13.3 0.2
35	0 12.0 1.6	0 30.5 1.4	0 46.8 1.2	0 59.9 0.9	1 8.9 0.5	1 13.5 0.1
40	+ 0 13.6 1.6	+ 0 31.9 1.4	+ 0 48.0 1.2	+ 1 0.8 0.9	+ 1 9.4 0.5	+ 1 13.6 0.1
45	0 15.2 1.6	0 33.3 1.5	0 49.2 1.2	1 1.7 0.9	1 9.9 0.5	1 13.7 0.1
50	0 16.8 1.5	0 34.8 1.4	0 50.4 1.1	1 2.6 0.8	1 10.4 0.5	1 13.8 0.1
55	0 18.3 1.5	0 36.2 1.4	0 51.5 1.1	1 3.4 0.8	1 10.9 0.5	1 13.9 0.0
60	+ 0 19.8 1.5	+ 0 37.6 1.4	+ 0 52.6 1.1	+ 1 4.2 0.8	+ 1 11.4 0.5	+ 1 13.9 0.0























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